

**RISKY BUSINESS:  
AN EXPLORATION OF ALCOHOL RISK ENVIRONMENTS  
SURROUNDING MILITARY INSTALLATIONS  
IN THE UNITED STATES**

by  
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## Abstract

**Statement of the Problem:** Approximately 33% of U.S. military personnel (defined here as active duty members in any service of the military) across the four services of the Department of Defense (DoD) (Navy, Army, Marines and Air Force) are heavy drinkers (defined as consumption of more than 14 drinks per week for men, and more than 7 drinks per week for women in the past twelve months). Increased alcohol misuse in the military negatively affects readiness and safety, thereby posing both a public health problem and a threat to national security. The goal of this dissertation is to build on experiences with interventions in drinking environments surrounding college campuses to analyze and suggest interventions in alcohol environments surrounding military installations.

**Methods:** Literature review of articles on alcohol use and related harms in colleges and the military, using Goffman's theory of total institutions as a conceptual framework; analysis of the alcohol outlet density per 1,000 individuals within five miles of military installations in eight U.S. states using ArcGIS; and environmental scans of on- and off-sale alcohol establishments near 12 military installations using scoring of environmental risk based on three of the four P's of marketing: promotion, product, and price. **Results:** Alcohol environments surrounding military installations have sufficient similarities to those surrounding college campuses, and patterns of drinking in the two populations are of sufficient high risk to warrant exploration of environmental interventions that have been effective in college settings in military settings as well. Alcohol outlet densities for some installations increase with proximity to the installation, and may occur at higher rates than densities around college campuses. Environmental scans suggest that level of risk in commercial establishments near military installations varies, and risk scoring can point to specific interventions.

**Conclusions:** Military drinking occurs at high levels and is likely to be affected by drinking environments near military installations. This dissertation sheds new light on these previously understudied environments, and points to the need for further research into outcomes of high levels of outlet density as well as effective interventions in these environments.

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## Chapter 1 : Introduction

There is abundant literature on risk and protective factors related to alcohol use in the civilian population (Campbell, Williams, & Gilgen, 2002; Hawkins & Catalano, 1992; Presley, Meilman, & Leichter, 2002; Serdula, Brewer, Gillespie, Denny, & Mokdad, 2004), but risk and protective factors specific to the United States (U.S.) military have not been substantially explored. This gap in the literature has implications for millions of service members, both active duty personnel as well as generations of veterans, as high levels of alcohol consumption among military personnel lead to a range of immediate and long-term negative outcomes, from violence and motor vehicle crashes to sexual assaults and reductions in combat readiness to aggression, anxiety, and post-traumatic stress disorder (PTSD) (Jakupcak et al., 2010; Larson, Wooten, Adams, & Merrick, 2012; Rossen, Pollack, Canham-Chervak, Canada, & Baker, 2011; Servies, Hu, Eick-Cost, & Otto, 2012; Taft et al., 2007). It is important to understand the potential bi-directional relationship between the military as an institution and the surrounding alcohol environment in order to continue protecting the lives of soldiers and their families.

Why is the alcohol environment around an installation<sup>1</sup> important? The traditional prevention approaches utilized by the military have not been successful in decreasing alcohol use among active duty personnel (Bray et al., 2012). Many of the military policies and programs focusing on prevention, including media and social norms campaigns, are described in Appendix A. New approaches must be considered in order to bring about change. A preponderance of the literature on civilians cites environmental strategies as having the greatest impact on the largest number of people. There is a substantial body of evidence about the value of environmental strategies in the reduction of alcohol use among the general population, including youth (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009; Babor et al., 2010; Campbell et al., 2009; DeJong et al., 1998; Mosher & Jernigan,

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<sup>1</sup> The term “installation” encompasses military bases, camps, posts, stations, yards, and other centers of military activity under the jurisdiction of the Department of Defense.

1989; T. F. Nelson, Weitzman, & Wechsler, 2005). There is also robust literature on the importance of the community surrounding college campuses (NIAAA, 2015; Toomey, Lenk, & Wagenaar, 2007; Wechsler & Nelson, 2008; Wolfson et al., 2012), but only two pilot studies regarding military bases (Ames & Cunradi, 2004; Spera, Barlas, Szoc, Prabhakaran, & Cambridge, 2012). Meanwhile, high-risk alcohol use and related consequences among military personnel remain high. In order to determine whether evidence-based environmental strategies should be tested in military communities, this dissertation analyzes the degree to which colleges and the military are similar institutions and therefore, by extension, whether interventions that have been effective on college campuses may also be applicable to military installations. This dissertation will also provide the first formative data on the nature of the environmental risks surrounding military installations, analyzing these risks through the framework of the four P's of alcohol marketing around military installations: Price, Promotion, Place, and Product (Cowan & Mosher, 1985). This dissertation will provide initial data to inform future implementation of evidence-based interventions and guide evaluation studies in communities around military installations.

### **Current Alcohol Use In The U.S. Military**

Current alcohol use in the military is well documented, and within today's U.S. military, heavy alcohol use is prevalent. Approximately 33% of U.S. military personnel (defined here as active duty service members in any service of the military) across the four services of the Department of Defense (DoD) (Navy, Army, Marines and Air Force) are heavy drinkers (defined as consumption of more than 14 drinks per week for men, and more than 7 drinks per week for women in the past twelve months) (Barlas, Higgins, Pflieger, & Diecker, 2013). Fully two-thirds of this group of heavy drinkers are under the age of 25, with 21.5% under the age of 21, and the additional 45% between 21 and 25 years of age (Barlas et al., 2013).

According to a standardized comparison presented in the most recent Health Related Behavior Survey (HRBS), the only DoD-funded survey of health in the military population, the prevalence of younger military personnel reporting heavy drinking rates was nearly two times as high

as their civilian counterparts. Conversely, among those age 36 or older, heavy alcohol use in the past 12 months is nearly the same among military personnel as their civilian counterparts (Barlas et al., 2013), suggesting both military personnel and civilians drink less as they get older (see Table 1.1).

[Insert Table 1.1]

In addition to heavy drinking, many military personnel are more likely to engage in binge drinking (defined as five or more drinks for men and four or more drinks for women per occasion). These rates vary by gender and service, with more male personnel binge drinking than female personnel, and Marines reporting the highest binge drinking across all services. Among Marines, nearly half of all personnel reported binge drinking in the past 30 days compared to, for example, only 23% within the Air Force (Barlas et al., 2013) (see Table 1.2)

[Insert Table 1.2]

Beyond the quantity and frequency of alcohol use, alcohol dependence is of concern in the military population. Among enlisted personnel in 2008, 14.6% of women and 22.8% of men were identified as moderately heavy drinkers (2-4 drinks per session once a week) and within those moderately heavy drinkers, 21.9% of women and 26.4% of men showed symptoms of alcohol dependence. In the same 2008 sample, 8.0% of women and 22.8% of men were heavy drinkers; however, the number reporting symptoms of alcohol dependence more than doubled among heavy drinkers (61.9% of women and 56.5% of men) (Brown, Bray, & Hartzell, 2010). In 2011, 1.9% of the Navy population had a possible dependence diagnosis and 11.5% reported drinking at or above hazardous levels (defined as having an Alcohol Use Disorders Identification Test (AUDIT) screening tool score greater than or equal to eight) (Bray et al., 2006).

### **Military Risk Factors For Alcohol Use**

In order to prevent heavy alcohol use during, immediately following, and decades after military service, it is necessary to look at risk and protective factors specific to the military environment and determine how these factors impact drinking. There is a very limited literature on the risk environments on and around military installations. Many installations have commissaries or Px's that sell alcohol, and many also have pubs or "officers clubs" where alcohol is be bought and

consumed on-sale, and alcohol use is supported by military officers (Hlad, 2012). Data on how frequently individuals are punished for engaging in behavior prohibited under military regulations are also not available; however, news articles have shown that service members continue to illegally drink alcohol in their barracks despite the threat of punishment (Brennan, 2012; Hlad, 2012). Data are also not available on the number of military personnel living off-installation, but studies have shown that military personnel frequently interact with their environment, particularly around the nightlife (Ames & Cunradi, 2004; Ames, Cunradi, Moore, & Stern, 2007; Hlad, 2012). The risk factors explored in the literature are largely focused on the individual, including exposure to stress, trauma, and combat, as described below.

There is some evidence that exposure to military-specific variables, including combat and military-related trauma, may be predictors of heavy alcohol use. For example, Vietnam veterans who were exposed to high war stress had higher rates of alcohol use than civilian counterparts (Kulka et al., 1990). Limited research on Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) has shown that, upon return to the U.S. from deployment, 9% of both reserve and active duty personnel reported new onset heavy weekly drinking, 53% reported binge drinking, and 15% reported alcohol-related problems. Controlling for age, gender, service, deployment length, and a number of other variables, these numbers were more than double their counterparts who did not deploy (Jacobson et al., 2008).

### **Military Consequences**

A Naval Admiral recently stated that “...the single biggest issue we face with respect to the degradation of readiness due to misconduct is the irresponsible use of alcohol. The large majority of the [site reports/operations reports] I receive reporting incidents of domestic violence, sexual assault, vehicle/motorcycle mishaps etc. have alcohol abuse as a key contributing factor” (USFF, 2011). Studies from samples of Army personnel found that alcohol misuse was associated with higher rates of physical aggression: of the 6,128 soldiers surveyed, the most commonly reported forms of alcohol-related minor aggression were grabbing someone (36%) and throwing something (26%). The most

frequently reported forms of alcohol-related major aggression were pushing or shoving someone (26%) and punching/hitting someone (22%) (Gallaway, Fink, Millikan, & Bell, 2012). The most commonly reported alcohol-related hospitalizations were due to injuries from falls, fights, head injuries, and poisonings (Howland, Bell, & Hollander, 2007). Binge drinkers in the military had a 68% greater likelihood than non-drinkers of perpetrating spousal abuse (Bell, Harford, Fuchs, McCarroll, & Schwartz, 2006) and the DoD estimates that 26,000 service members experienced incidents of unwanted sexual contact in 2012, many of which have been linked to alcohol use (Department of Defense, 2012).

Excessive drinking in the U.S. military is particularly dangerous as it reduces combat readiness (Federman, Bray, & Kroutil, 2000). A key finding of a 2012 Institute of Medicine (IOM) report on substance abuse in the military was that increased alcohol misuse in the military negatively affects readiness and safety, thereby posing a significant public health problem that expands into national security risks (Institute of Medicine, 2012). A 2002 study found that 18.4% of active duty military personnel who were current drinkers reported one or more alcohol-attributable problems related to their job performance in the past 12 months; this number increased to 28.9% among binge drinkers. Additionally, 28.1% of current drinkers and 40% of binge drinkers reported injury-related outcomes or risk behaviors and 7.7% of current drinkers and 12.5% of binge drinkers reported criminal justice problems (Stahre, Brewer, Fonseca, & Naimi, 2009). Alcohol use affects cognitive functioning, which can impact decision-making, response time, and mental alertness, qualities that are crucial to a combat ready soldier (Federman et al., 2000).

### **Alcohol Use Prevention Efforts in the Military**

The military's relationship to alcohol is important for understanding the context and legal parameters for this behavior. Research suggests that differences in alcohol use among Vietnam veterans and civilians may have been a result of the "sociocultural environment of the military at the time, which may have encouraged drinking" (Kulka et al., 1990, pg. 125). Despite this recognition, and the fact that the role of the sociocultural environment continues to affect alcohol use in the

military, no analysis of how to intervene in that environment – including at the policy and cultural levels – has been undertaken to date. Despite this lack of an evidence base, a number of intervention have been proposed to address this issue; thus far, the large majority have focused on programs that target individual behavior despite evidence that suggests this is not the most effective point of intervention (Mosher & Jernigan, 1989). The ideal intervention for this complex issue is a multi-level, multi-component approach that addresses both the individual and the environment in which he or she lives and works.

Although current DoD policy strongly discourages binge or excessive alcohol use, high rates remain and continue to need to be addressed (Institute of Medicine, 2012). There are currently three primary approaches to reducing alcohol consumption in the military: (i) changing social norms and the military culture surrounding drinking, such as the “That Guy” Campaign (see Appendix B) (Aldridge-Gerry, Cucciare, Ghaus, & Ketrosier, 2012; Ames & Cunradi, 2004); (ii) increasing alcohol education and personal responsibility as part of the military curriculum, such as the PREVENT program (Personal Responsibility: Values and Education Training) (Ames & Cunradi, 2004; Ames et al., 2007); and (iii) improving screening, brief intervention, and referral to treatment programs (SBIRT) (Ahmadi & Green, 2011; Bartone, Hystad, Eid, & Brevik, 2012; Cucciare, Boden, & Weingardt, 2012).

There is less work being done at the environmental level. In its 2012 report, the IOM issued 12 recommendations to reduce rates of substance use and related health outcomes in the U.S. military. The first recommendation read: “DoD and the individual branches should implement a comprehensive set of evidence-based prevention programs and policies that include universal, selective, and indicated interventions” (Institute of Medicine, 2012). The IOM specifically recognized the need for consistent enforcement of regulations on underage drinking, reducing alcohol outlet density in communities around installations, limiting days and hours of alcohol sales, and improving SBIRT programs. Implementation of these strategies would address the entire military population, not just high-risk drinkers, and thus holds the potential of substantial impact on the health, well-

being, and combat readiness of military personnel. In light of the strong evidence base of effective policies to reduce underage and harmful drinking in the civilian context (Babor et al., 2010), there is an opportunity to make recommendations based on an analysis of existing DoD policies. Much of the DoD's substance use policy is found in DoD Instruction Number 1010.04: Problematic Substance Use by DoD Personnel (Department of Defense, 2014). This policy intends to "prevent and eliminate problematic substance use in the DoD" as substance use is incompatible with the overall goal of force readiness. This policy mandates substance use education and awareness, including universal community education and awareness campaigns, selective prevention services for those at risk of a substance use disorder as identified by the DoD, and education and awareness services for those with problematic use. The policy also calls for alcohol use screening by healthcare providers, evaluation for treatment services, treatment services, and command, supervisor, and family involvement in treatment and recovery. Additional military policies compiled by the Institute of Medicine related to substance use are found in Table 1.3, and a description of military prevention programs are in Appendix A (Institute of Medicine, 2012). It is important to note that many of these policies and programs are working to prevent and identify substance use disorders, and may not capture those who engage in risky drinking but who do not qualify for a diagnosed disorder.

[Insert Table 1.3]

## **Theoretical Foundations**

Central to this dissertation is the understanding that military and community alcohol problems are strongly entrenched in the cultures of both the military institution and the community. Influencing this environment requires evidence-based interventions that go beyond the individual risk factors among military personnel, focusing instead on environmental strategies and recognizing the importance of engaging the community in addressing alcohol-related harms. This dissertation utilizes three primary theories to explore and describe the alcohol environment: total institutions (Goffman, 1961), the socio-ecological model (Krug, Mercy, Dahlberg, & Zwi, 2002; McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokols, 1996), and the marketing taxonomy of the 4Ps (price, place,

product, and promotion) (Cowan & Mosher, 1985; M. C. Jackson, Hastings, Wheeler, Eadie, & MacKintosh, 2000). Erving Goffman's theory of total institutions serves as the foundation for the entire dissertation, and is used to posit that colleges and the military are similar institutions that exhibit a certain amount of control over their students or personnel. It is with this theoretical grounding that this dissertation shows the similarities between these institutions, and then argues that interventions that have been successful in college settings could be tested in the military context. The socio-ecological model provides the critical foundation for analyzing the problem of excessive drinking in the military from a multi-level, multi-component approach. Excessive alcohol use and related harms must be prevented at the individual, organizational, and community level, including screening and brief intervention, banning high-risk alcohol establishments, and reducing alcohol outlet density around military installations. Focusing on only one of these levels will not address the myriad of risk factors that impact high-risk drinking in the military population. Finally, this dissertation largely frames the environmental risks and recommended interventions in the marketing taxonomy of the 4 P's: Place, Price, Promotion, and Product. These four components of marketing can be addressed at both the organizational and institutional level through interventions that have been tested on and around college campuses, bringing the three theories utilized in this dissertation together into an overall approach focused on evidence-based interventions to prevent high-risk alcohol consumption around military installations.

As will be discussed in detail in the following chapters, a number of evidence-based prevention interventions have been effective in reducing underage and excessive alcohol use at a population-level. The World Health Organization has identified three "best buys" to reduce alcohol-related harms, including associated non-communicable diseases: increasing alcohol taxes, restricting access to alcohol in retail environments, and banning alcohol advertising (Bloom et al., 2011). These best buys are grounded in a shift from individually-focused interventions to population-level interventions and an increased focus on the broader health and social consequences of alcohol use (Mosher & Jernigan, 1989; Edwards, 1997; Cohen et al., 2000; Anderson et al., 2009). This



dissertation focuses on the potential for change at the population level, emphasizing interventions that reduce the access and availability of alcohol for the entire population by modifying the contexts in which individuals make their decisions about drinking.

## **Key Gaps in the Literature**

Though there is an extensive body of literature documenting the prevalence of alcohol use and related harms in the U.S. military (Barlas et al., 2013; Bohnert et al., 2012; Brown et al., 2010; Hanwella, de Silva, & Jayasekera, 2012; Lande, Marin, Chang, & Lande, 2008; Stahre et al., 2009), research has primarily focused on the individual-level risk factors contributing to the high rates of alcohol use in this population, including PTSD (Bremner, Southwick, Darnell, & Charney, 1996; Carter, Capone, & Short, 2011; Jakupcak et al., 2010; Kehle et al., 2012; Kline et al., 2013; Nazarian, Kimerling, & Frayne, 2012), stress (Blume, Schmalting, & Russell, 2010; Brown, Williams, Bray, & Hourani, 2012; Elbogen et al., 2012; Foran, Heyman, & Slep, 2011), and exposure to combat (Brown et al., 2012; Hanwella et al., 2012; Kline et al., 2013; K. M. Wright, Foran, Wood, Eckford, & McGurk, 2012). However, there is a limited understanding of the environmental risk factors contributing to the high rates of alcohol use in this population (Ames & Spera, 2011; Spera et al., 2012). The role of the community in influencing drinking on and around college campuses has been well documented (Borsari, 2004; Clapp, Reed, Holmes, Lange, & Voas, 2006; Erenberg & Hacker, 1997a; Kuo, Wechsler, Greenberg, & Lee, 2003; Scribner et al., 2008; Wechsler, Lee, Kuo, et al., 2002), as have successful environmental strategies to reduce these risk factors (DeJong et al., 1998; Saltz, Paschall, McGaffigan, & Nygaard, 2010; Toomey et al., 2007; Wolfson et al., 2012). This study seeks to describe the alcohol environment around military installations to provide a baseline understanding of how the alcohol environment around military installations may or may not be similar to that of college campuses, and to describe why the interventions that have been successful with the college population may also be successful with the military population.

## Aims

This dissertation has three primary aims, developed to better understand the alcohol risk environment around military installations and the evidence-based interventions that may be effective in preventing excessive alcohol use and related harms. These aims build upon one another:

**Aim 1: Understanding the Military as a Strong Institution and Implications for Alcohol Interventions** – establishing a theoretical basis for comparing alcohol behaviors and prevention efforts in the military, and in colleges using Goffman’s theory of total institutions (Goffman, 1961), and the implications of this for addressing the alcohol environment in order to preventing and reducing excessive drinking in the military using colleges as a model;

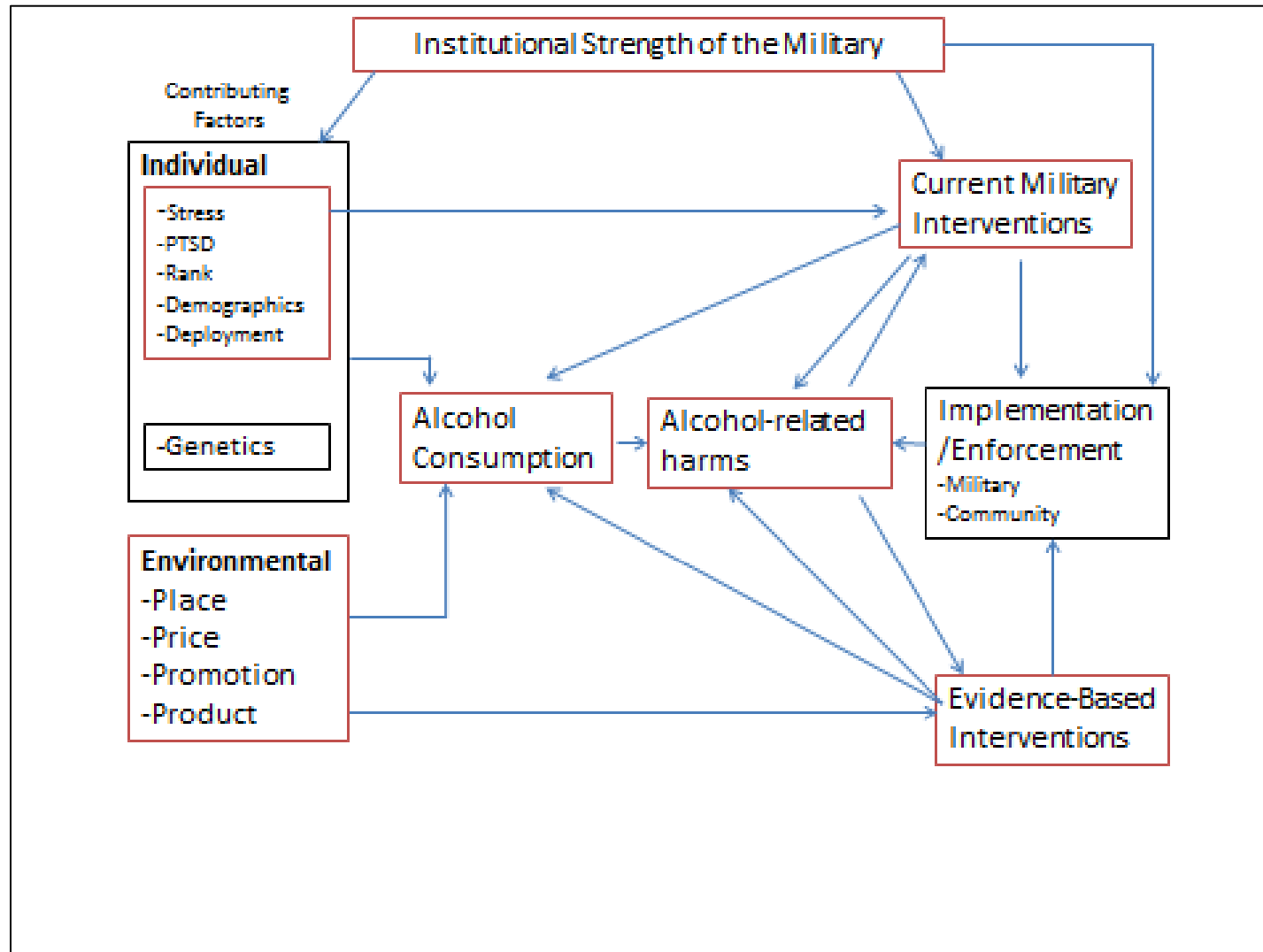
**Aim 2: An Analysis of the Alcohol Outlet Density Directly Surrounding Military Installations** - identifying the alcohol outlet density surrounding military installations and determining whether the number of establishments decreases as one moves further away from the installation; and

**Aim 3: A Description of the Alcohol Environment surrounding 12 U.S. Military Installations** - analyzing promotional, price, place, and product factors using the marketing taxonomy of the 4P’s (Cowan & Mosher, 1985; M. C. Jackson et al., 2000) in both on- and off-sale alcohol establishments near military installations.

These aims and their relationships to one another are visually represented in Figure 1.1. The military’s strength as an institution influences both the contributing factors of alcohol use and harms, as well as the interventions implemented to reduce the harm. There are two primary categories of contributing factors influencing alcohol-related harms: (i) Individual risk factors, including genetics, stress, PTSD, demographics; and (ii) environmental factors, including place, price, promotion, and product. These factors directly influence excessive alcohol consumption, which it turn leads to alcohol-related harm. Additionally, the contributing factors determine which current alcohol interventions are being utilized by the military, as well as other environmental evidence-based

interventions that could be adopted to further reduce alcohol consumption and related harms among military personnel. The implementation and enforcement of these interventions will also determine their effectiveness in reducing harms and consumption, which will be directly impacted by the military institution. Boxes in red are the concepts being discussed in this dissertation.

Figure 1.1: Conceptual Model



**Table 1.1: Heavy Alcohol use in past 12 months: active duty personnel and civilians, 2011**

	<b>18-20</b>	<b>21-25</b>	<b>26-35 years</b>	<b>36-45 years</b>	<b>46-64 years</b>
Military	5.9%	14.3%	8.2%	4.8%	4.6%
Civilian	2.5%	6.9%	4.5%	5.0%	5.4%
Source: (Barlas et al., 2013)					

**Table 1.2: Past 30 Day Binge Drinking Rate By Gender And Military Service**

	<b>Male (total DoD)</b>	<b>Female (total DoD)</b>	<b>Army</b>	<b>Air Force</b>	<b>Marines</b>	<b>Navy</b>
Binge drinking (past 30 days)	34.8%	24.6%	32.2%	22.7%	8.2%	36.1%
Source: (Barlas et al., 2013)						

**Table 1.3: Military Policies and Directives Related to Substance Use Disorders**

Directive/Policy Number	Directive/Policy Name
<b>Department of Defense (DoD)</b>	
DODD 1010.1	Military Personnel Drug Abuse Testing Program
DODD 1010.4	Drug and Alcohol Abuse by DoD Personnel
DODI 1010.6	Rehabilitation and Referral Services for Alcohol and Drug Abusers
DODD 1010.9	DoD Civilian Employee Drug Abuse Testing Program
DODI 6490.03	Deployment Health
DODI 6490.08	Command Notification Requirements to Dispel Stigma in Providing Mental Health Care to Service Members
Department of Veterans Affairs (VA)/DoD	VA/DoD Clinical Practice Guideline: Management of Substance Use Disorders (2009)
<b>Air Force</b>	
AFI 44-121	Alcohol and Drug Abuse Prevention and Treatment (ADAPT) Program
AFI 44-172	Medical Operations: Mental Health
<b>Army</b>	
AR 600-85	The Army Substance Abuse Program
ALARACT 062/2011	Changes to Length of Authorized Duration of Controlled Substances Prescriptions in MEDCOM Regulation 40-51
<b>Navy</b>	
OPNAV 5350.4D	Navy Alcohol and Drug Abuse Prevention and Control
SECNAVINST 5300.28E	Military Substance Abuse Prevention and Control
BUMEDINST 5350.4	Navy Medicine Alcohol and Drug Prevention Program
BUMEDINST 5353.3	Use of Disulfiram (Antabuse)
BUMEDINST 5353.4A	Standards for Provision of Substance Related Disorder Treatment Services
<b>Marine Corps</b>	
NAVMC 2931	Marine Corps Drug and Alcohol Abuse, Prevention, and Treatment Programs
MCO 5300.17	Marine Corps Substance Abuse Program
Source: (Institute of Medicine, 2012)	

## **Chapter 2 : Methodology**

This study employed three primary forms of data collection: a literature review, geographic information system (GIS) analysis, and environmental scanning. Each will be described in detail here and again briefly in the subsequent chapters.

### **Aim 1: Understanding the Military as a Total Institution and Implications for Alcohol Interventions**

In order to assess the similarities and differences in alcohol use, harm, and interventions in the college and military, the following phrases were used to capture relevant literature: “alcohol use in the military”, “alcohol related harms in the military”, “alcohol use in colleges”, “alcohol related harms in colleges”, “military sociology/culture” “college sociology/culture”, “military as a total institution”, “college as a total institution”, “reducing alcohol use in the military”, and “reducing alcohol use in college”. Literature published through June, 2015 was considered for inclusion in this paper. Searches were conducted using PubMed, PsychInfo, and Google Scholar, as well as reviewing the references cited in articles found through the search.

The Department of Defense’s (DoD) Health Related Behaviors Survey (HRBS) provided the majority of alcohol prevalence and behavior data for the military. HRBS, conducted approximately every three years, is a military-specific population-based survey that assesses trends among active duty and reserve personnel. It is the most consistent source of data on alcohol use across all services of the U.S. military. However, servicemen and women may be under-reporting their alcohol or other drug use in fear of consequence from the DoD and the potential for serious penalties for any illegal or unsanctioned behavior (Del Boca & Darkes, 2003; Gutierrez, Blume, Schmalings, & Stoevers, 2006).

The National Survey on Drug Use and Health (NSDUH) was used for much of the prevalence data for college populations. NSDUH is a nationwide survey administered annually for nearly 70,000 people in the United States aged 12 and older. Data collected includes national and state-level estimates on the use of tobacco, alcohol, and illicit drugs in order to track trends in risky behavior, assess the consequences of substance use, and identify the groups at highest risk of



substance use and abuse (CBHSQ, nd). Under-reporting is also a possibility on this survey; general population surveys of alcohol consumption have usually captured only 22-32% of consumption as measured by alcohol sales data (D. E. Nelson, Naimi, Brewer, & Roebert, 2010).

These data surveys, articles, and books were reviewed for comparisons of individual and organizational behavior regarding both alcohol consumption and prevention. Current and historical prevention efforts by both colleges and the military were used in this paper to illustrate the broader context of the alcohol culture in these institutions. Additionally, military websites were reviewed for program and policy information, and mainstream and military newspapers were also reviewed for additional perspectives and information on alcohol use in the military.

In addition to military and college data, this paper builds on the sociological underpinnings of Erving Goffman's *Asylums* (Goffman, 1961), adapting his ideal type of a total institution to describe the military and colleges as strong, but not total, institutions. The book was analyzed not only for direct references to the military as a total institution, but for a deeper understanding of how this theory may be applied to both colleges and the military. Critiques of the total institutions theory were also considered in order to determine additional strengths and weaknesses of applying this theory to the aforementioned organizations. This included doing additional searches on Google Scholar and PsychInfo with the search terms "critiques of Goffman", "critiques of Asylums", "perspectives on Asylums", and "responses to Asylums". References within each article were also reviewed for potential additional resources. These critiques allowed for a deeper understanding of both the theory itself and the inherent limitations in applying the total institutions to colleges and the military. It was through this thorough review of the original theory and the available critiques that it became clear that colleges and the military are not total institutions, but are instead "strong" institutions that embody many of the same characteristics as total institutions but do not have total and complete control of their personnel, including not locking people in the institution, as is the case in prisons or mental institutions.

## **Aim 2: An Analysis of the Alcohol Outlet Density Directly Surrounding Military Installations**

The alcohol outlet density around military installations in eight states was captured using ArcGIS mapping software (ESRI, 2015) and analyzed to determine the number of alcohol outlets per 1,000 people within varying radii of installations in each state in the sample.

### **Alcohol License Data**

Addresses of licensed alcohol establishments (e.g., bars, liquor stores) were obtained in 2014 from state licensing agencies such as Alcohol Beverage Control Departments (ABC) or Departments of Licensing/Regulation (referred to as ABC throughout this dissertation) for each of the eight states in the sample. ABC websites were searched for publically available lists of licensing data, and the lead author also contacted state ABCs to confirm the data on the website is the most recently available. Many sites did not have publically available data, or did not respond to additional email requests for data. More recent searches have found that additional states have made their data publically available; ideally these additional states would have been included in this dataset but time did not allow it. Additional requests could have been sent to ABCs, and if financial resources were available, licensing data could have been purchased from states that did not make their information publically available. Lists obtained from state alcohol ABCs were sent in Excel and cleaned for missing data, duplication, and consistency in variable names across states. On-sale establishments (e.g., bars, restaurants) and off-sale establishments (e.g., convenience stores, gas stations, grocery stores, liquor stores) were included. Alcohol distributors, wholesalers, and wineries were excluded from the study to more accurately capture commercial establishments where military personnel may purchase alcohol.

Each record in the dataset included the establishment name, street address, and type of license (on- or off-sale) of the outlet. Addresses for licensed establishments were geocoded using the World Geocode Service on ArcMap 10.3.1 (ESRI, 2015). Geocoding produced spatial matches for 98-100% of licensed outlets for each state for a total of 212,068 alcohol establishments included in the data. Approximately 3,300 establishments (1.6%) could not be geocoded, because they had misspelling in the street name, the wrong zip code, or incorrect street addresses. On- and off-sale

establishments were mapped separately and then combined for analyses (Kypri, Bell, Hay, & Baxter, 2008; Weitzman, Folkman, Folkman, & Wechsler, 2003).

### **States**

States selected for analysis were those that had free and publicly available licensing data from their ABC at the state level and had one or more military installations. Based on these selection criteria, Arizona, California, Florida, Nebraska, North Carolina, Texas, Virginia, and Washington were selected for the study.

### **Population Data**

Population data were obtained at the block-group level from the National Historical Geographic Information System (NHGIS). Within NHGIS, general population came from the 2010 census and military population data from the 2009-2013 American Community Survey. The NHGIS makes these data available in shapefiles to be manipulated by ArcGIS. Population demographics are available within the block group data, but were not utilized in this dissertation. Future studies could look specifically at the alcohol outlet density by different age, race, and gender stratifications to better understand potential patterns in alcohol outlet clustering.

### **Military Installation Data**

U.S. street and military installation data were obtained from TIGER files (Topologically Integrated, Geographically Encoded Reference files), which are geographic databases available through the U.S. Census Bureau. The files provide street-level maps for the entire U.S. and include address ranges by block. Data on military installations, including nearby towns and military population size, were abstracted from an official Department of Defense website for military installation resources (Department of Defense, 2015).

The population of military installations in the U.S. varies greatly, ranging from less than fifty to more than 50,000 active duty military personnel (Department of Defense, 2015). To make the populations of the installations in the sample more comparable, installations within each military service were stratified by population size and all installations in the top quartile of installation population per service, per state were included in the final sample. Table 4.1 shows the percent of

installations and active duty personnel included in the sample compared to the total number of installations and installation personnel across the U.S.

### **Analysis**

Analyses were conducted at the state rather than the installation level because of the importance of state policy environments for determining the degree of alcohol availability (Xuan et al., 2015). Prior studies around colleges considered alcohol outlet density at one, two, and three mile radii from the campus (Scribner et al., 2008; Weitzman et al., 2003). However, as many military installations are near towns, rather than directly in towns like colleges, this study of on- and off-sale alcohol outlets modifies the previously cited approaches to include the density within one, two, three, four and five mile radii from the military installation. This approach is used to determine whether outlets are clustered around the installations, or whether any outlet density is a function of proximity to a town population center. Results from one, two, and five miles are presented here in order to reflect any clustering around the military installation and potential effects of nearby towns. The number of on-sale, off-sale, and total alcohol establishments was mapped per 1,000 total people within each Block Group, inclusive of military personnel. Density was also determined specifically per 1,000 military personnel within each Block Group. This approach follows Scribner et al.'s model of analyzing the total outlets per 1,000 college students, providing a point of direct comparison to college campuses at the three-mile radius (Scribner et al., 2008).

Using ArcGIS, points on a map were placed at each road entrance of the respective installation to determine the one through five mile radii around military installations. Mile radii were drawn from each of these entrance points to reflect the primary routes personnel travel to get to and from the installation. The combined general population and specific military population Block Group shapefiles were each intersected with the one, two, three, four, and five-mile buffers to capture accurate census data for each radius, including the total population per Block Group per mile. The final step was to intersect the mile-based census files with the full alcohol shapefile using ArcGIS, which included the addresses and counts of both on- and off-sale establishments. Buffers are radii

drawn in ArcGIS that overlay other data; the use of a buffer allows for the joining of alcohol licensing data and population data within a specific distance from the military installations. The final dataset in ArcGIS had, for each buffered mile, the total population, the military population, and the total number of on- and off-sale alcohol establishments (see Figure 1, using an installation in a large western state as an example). Virginia's installations were too close together to appropriately attribute outlets at four and five miles to a particular installation, and therefore these buffers were not included in the study.

Any duplicate establishments captured by ArcGIS due to overlapping mile buffers from the proximity of entrance points to a single base were removed. Each buffer included calculations for the number of on-sale, off-sale, and total alcohol outlets per 1,000 persons and per 1,000 military personnel. The percent change between mile one and each subsequent mile (two to five) was also calculated to determine the overall difference in alcohol outlet density as the analysis moved further away from the installation. Finally, a separate analysis was conducted to compare the number of alcohol establishments per 1,000 military personnel to similar data in the college context, and the alcohol outlet density at three miles was summed across all eight states in the sample for this analysis.

### **Aim 3: A Description of the Alcohol Environment surrounding 12 U.S. Military Installations**

To analyze alcohol risk environments around military installations, the third paper in this dissertation involved primary data collection in alcohol outlets around military installations across the United States. The use of environmental scans has been validated through work on alcohol, tobacco, and other drug issues around college campuses and in communities across the US (Feighery, Ribisl, Schleicher, Lee, & Halvorson, 2001; Henriksen et al., 2008; Wagoner et al., 2014). An environmental scanning instrument (described in greater detail below) for alcohol outlets near military installations was designed to evaluate what risks these establishments create through alcohol advertising, alcohol prices, and alcohol products. Data collection required going into each community, collecting data

immediately adjacent to and within alcohol establishments, and recording observations of the types of products and promotions in each establishment.

### **Military installations**

Environmental scans, defined as “a form of community assessment that investigates the physical elements within a community contributing to alcohol or other drug use” (Olson, n.d. ), were conducted in alcohol establishments around three randomly selected installations for each of the four DoD services of the military (Air Force, Army, Marine Corps, Navy) for a total of twelve military installations. A list of all installations in each of the four major military services was created using publically available DoD data with the location of the installation and size of the military population at that installation (Department of Defense, 2015). From this list, installations for each service were stratified by population size at each installation, capturing only the top tertile of installations. Four installations were randomly selected from each service-specific list and included in the final sample. Table 4.2 presents the sample of installations included in the study, along with the percent of the total military population present on each installation for an analysis of representativeness.

### **Alcohol Establishments**

Before conducting site visits to and environmental scans around each of the selected military installations, the lead author obtained lists of on and off-sale alcohol outlets in the town adjacent to each installation in eight states with publicly available data through the state ABCs. Lists of on- and off- alcohol establishments were geocoded using the GIS software ArcMap 10.3 (ESRI, 2015), and circular one, two, and five mile buffers, drawn from each entry point to the installations, were developed using ArcGIS spatial analysis. Five on-sale (restaurants and bars) and five off-sale (convenience, grocery, and liquor stores) alcohol establishments were then randomly selected from within a two-mile buffer of each military installation in order to capture the establishments in closest proximity to the military installation while allowing for a broader representation of establishments than would be possible if only scanning establishments within one mile of the installation. If there were fewer than ten establishments within two miles of an installation, the remaining establishments were randomly selected from within the five-mile buffer. If an outlet was closed, the next closest

outlet was visited. This happened for approximately 5% of the establishments scanned. Similar sampling methodology has been used and validated in a number of existing studies conducting environmental scans of both alcohol and tobacco outlets (Henriksen et al., 2008; Scribner et al., 2008; Wagoner et al., 2014; Wakefield et al., 2002). A table of the total establishments within two miles of the installations is provided in Appendix E.

### **Measures**

The scans utilized a newly developed scanning tool specific to the military community. The tool was created by modifying the Community Anti-Drug Coalitions of America's Environmental Strategies scan (CADCA, 2010); the California Alcohol Beverage Control's Responsible Beverage Service guide (CA ABC, n.d.), the Idaho Prosecuting Attorney's environmental scanning tool (Olson, n.d. ), and the Lee Law Toolkit (California Friday Night Live Partnership, 2013). Two separate tools were created: one for off-sale establishments and one for on-sale establishments. Most of the questions remained the same across the two tools, but were slightly adjusted to reflect differences between the types of establishments. For example, the on-sale scan included a question on the presence of drinking games, which would not be found in off-sale establishments, and asked about the price of one drink (one pint of beer, one shot of vodka) rather than a six-pack of beer or a bottle of vodka. The off-sale scan asked about the location of alcohol, such as whether it is sold in coolers directly adjacent to non-alcoholic beverages, and included different products that are not typically found in on-sale establishments, such as pre-mixed pouches and airline-sized bottles of alcohol. The scanning instrument covered three of the 4 P's of marketing (product, promotion, and price) (Cowan & Mosher, 1985), with "place" having been analyzed in a prior paper (A. Sparks, Cohen, Rutkow, Smith, & Jernigan, In Progress). The variables included in the scan were drawn from research studies linking elements of the 4 P's to high-risk alcohol consumption and related consequences, particularly in the college environment, which has many similarities to military installations (A. Sparks, Smith, Cohen, Rutkow, & Jernigan, In Progress). Questions included, but were not limited to: type of outlet (grocery store, convenience store, liquor store, bar, or restaurant); alcohol products available; price of

product (for beer, liquor, and wine); promotions (events, price promotions); and presence of interior and exterior advertising (coded for extent as well as for content targeted to military personnel through images of soldiers, military equipment such as tanks or weapons, or slogans directed towards the military such as “Budweiser supports our troops” and “Welcome back to the [Miller] High Life”). The specific alcoholic beverages and brands scanned were based on the most popular brands among underage drinkers in each category of beer, vodka, malt liquor and fortified wine (Siegel et al., 2013). The full scan instruments are available in Appendices C and D.

### **Scanning**

The lead author conducted all scans using Google Forms on a mobile device while at each establishment. Scans were done during the day whenever possible: data were first collected outside of the establishment, observing patrons and the atmosphere, counting the number of outdoor alcohol advertisements and looking for “We ID” or other age verification notices. The scanner then entered the establishment. In off-sale establishments, the scanner walked around the store counting the alcohol advertisements, recording the types of alcohol products and their placement, and capturing the price of beer, wine, and spirits. Discounts on alcohol were also noted, including the brand and level of discounting. Once the scanner entered an on-sale establishment, they sat at a table or at the bar and again counted the alcohol advertisements inside the establishment and noted alcohol promotions or specials. The scanner also entered restrooms to count advertisements and promotion flyers as this is a common area for promotions. The types and prices of alcohol were captured by either talking to the waiter or bartender, or analyzing the menu. The data captured via Google Forms populated a spreadsheet to be cleaned and analyzed.

### **Analysis**

Some variables were excluded from the analysis that either were repetitive with ones already included in this analysis, such as additional questions on price discounting, or fit into the P of “place”, which was not analyzed in this paper. In the absence of a validated tool to assess the risk of alcohol establishments, this study analyzed data using two, three, and four risk categories. Creating a two-category risk index limited the specificity in the data collected, and the four-category risk scale



presented little variation in the findings. As a result, this study presents a three-category risk index (low, medium, high) in order to analyze the risk of each establishment. To facilitate comparison across establishments as well as across and within military services, a three-category risk index was created by assigning a score of 0, 1, or 2 for variables recognized as having the potential for creating risk for excessive alcohol use in the literature. For dichotomous variables, a score of zero indicated the variable was not present, and two indicated that it was. For variables for which there was a gradation of risk, including many of the advertising and promotion variables, a zero denoted low risk, and a value greater than zero and less than the mean was medium risk (scoring 1 point) while anything greater than the mean was high risk (scoring 2 points). Price variables were an exception to this rule; as lower price is correlated with higher risk (Wagenaar, Salois, & Komro, 2009), these variables were reverse coded. Price variables within one standard deviation of the mean were given a “1”; variables more than one standard deviation above the mean were given a “0” and more than one standard deviation below the mean were given a “2”. Categories for high, medium, and low-risk establishments were created by dividing the highest points scored by the establishments into equal tertiles for both the on- and off-sale scales. Though the highest points scored differed for the on-sale and off-sale risk scores, the categories were determined in the same way. See Table 5.2 for the coding scheme for each variable.

These methods combine to facilitate the first comprehensive analysis of alcohol environments around military installations in the United States.

## **Chapter 3 : Interventions to Reduce Alcohol Consumption and Related Consequences: A Comparison of Colleges and Military Installations**

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**Keywords:** Military, soldier, alcohol, substance use, health, college, total institution

### **Abstract**

There are no data currently available on the effectiveness of strategies targeting the environments surrounding military installations to reduce excessive alcohol use and related harms among soldiers. There is, however, a substantial literature regarding this approach to address excessive college drinking. This paper explores similarities and differences between military and college drinking at the individual (soldiers and students), peer (fraternities and sororities, military groups), organizational (campus and installation), and community (policies and systems) levels of analysis. It then analyzes available evidence regarding environmental interventions using as a framework the four P's of marketing: product, promotion, price and place. Adapting Goffman's theory of total institutions, this paper examines how both colleges and the military interact with and address alcohol use as institutions, drawing on epidemiological and qualitative data on alcohol consumption and related harms for both the college and military population, as well as data on alcohol risk factors, consequences, and overall alcohol environments for both populations. Comparison of how alcohol is consumed, condoned, and restricted within collegiate and military institutions provides a crucial context for assessing the potential of evidence-based strategies that could be implemented in the military and around military installations. This paper theorizes that both the institutions of colleges and the military have supported and condoned similar alcohol environments. Similarities between the two institutions suggest that interventions shown effective in reducing excessive and high-risk alcohol use on and around college campuses may also have applicability for military installations.

## Introduction

Residential post-secondary educational institutions (henceforward referred to as “colleges”) and the military in the United States have a number of key characteristics in common relative to young adults. Both may provide something of a “liminal period,” a transition between adolescence and adulthood in which identity is formed and important health behaviors are established (Arnett, 1994; Kelty, Kleykamp, & Segal, 2010; Maggs & Schulenberg, 2004). Both may provide structure when adolescents leave the family, offering a range of new experiences and a concomitant identity from those experiences.

Among these new experiences are increased opportunities to consume alcohol, which comes with cultural meanings attached to that consumption. The two institutions also share several risk factors that may influence excessive alcohol consumption, including the presence of young, unmarried adults; living in communal spaces such as dormitories or barracks; and alcohol sales and consumption environments adjacent to many campuses and military installations (Stahre et al., 2009). Those living with others consistently perceive that their living group drinks more than they or their close friends do (Baer, Stacy, & Larimer, 1991); students who live in substance-free housing have reported drinking less than those living in non-substance free housing or in fraternity/sorority housing (Wechsler, Lee, Kuo, et al., 2002).

In fact, evidence suggests that young people who are in college and on military installations drink more and consequently suffer more alcohol-related problems than their non-college and non-military peers (Fear & Wessely, 2009; Jones & Fear, 2011; T. F. Nelson, Xuan, Lee, Weitzman, & Wechsler, 2009). There is a relative wealth of data on alcohol use in college contexts in the United States (U.S.), including studies of the importance of drinking environments in shaping behavior (K. M. Jackson, Sher, & Park, 2005; D. E. Nelson, Naimi, Brewer, & Nelson, 2009; Presley et al., 2002; Scribner et al., 2008). In contrast, there is a marked lack of evidence about the role of alcohol environments in U.S. military drinking. Addressing this requires focusing not only on military installations but also on what is happening in the local community right outside of installation walls,

including the bars, restaurants, and liquor stores that contribute to excessive and underage drinking. Young people’s exploration of these environments and opportunities is reflected in the similarities in alcohol consumption and risk behavior rates between college students and military personnel (Barlas et al., 2013; SAMHSA, 2014b; Stahre et al., 2009).

One possible way to address the gap in knowledge about how to prevent excessive drinking in high-risk alcohol environments around the military is to use findings on college drinking and apply them to military contexts. However, this is only possible if the college and military contexts, although governed by different rules, are sufficiently similar to permit such a transfer. To explore these similarities as they relate to alcohol use and related problems in a multi-level context, this paper utilizes the Social-Ecological Model (Krug et al., 2002; McLeroy et al., 1988; Stokols, 1996) to examine the characteristics of individuals, peers, organizations, and communities in college and military installations settings regarding alcohol use, sale, and availability.

To provide a theoretical and analytic framework for this comparison, the paper adapts Erving Goffman’s conceptualization of a “total institution” as defined in Asylums (Goffman, 1961) to describe what are “strong” rather than “total” institutions. While both colleges and the military share many of the core components of Goffman’s total institution (J. P. Wright, Carter, & Cullen, 2005), they are also involved with and embedded in surrounding communities, and this embedding limits the power of the respective organizational hierarchies. Table 3.1 describes how the four core tenets of a total institution may be applied to both colleges and the military.

[Insert Table 3.1 here]

Thus, both institutions engender the creation of new identities. Research has suggested that poor health habits such as tobacco and alcohol use are learned and often increased in the military and college environments (Reed, Wang, Shillington, Clapp, & Lange, 2007; Teachman, nd; Wechsler & Nelson, 2008); this learning occurs in the context of the creation of these new identities, and the inculcation into a new “culture” that goes along with it. In both cases, the institution may have facilitated the adoption of risky behavior or habits early in a soldier’s or student’s career (Bedard &

Deschênes, 2006; Wechsler & Nelson, 2008). Conversely, because of the high degree of control over individual behavior typical of a strong institution, both the military and, perhaps to a lesser degree, colleges can use their institutional power to shape the behavior of individuals and the contexts in which they make their behavioral decisions. For example, many colleges as well as the military have increasingly banned or limited smoking on campus or in parts of the installation, using their institutional power to shape individual behavioral choices (Halperin & Rigotti, 2003; Harris, Stearns, Kovach, & Harrar, 2009; Lee et al., 2010).

The goal of this paper is to compare drinking rates, alcohol-related harms, and interventions between colleges and the military in order to assess the degree to which findings in college settings can be applied to the military. While there are substantial differences between the two types of institutions, available data are synthesized to gain a better understanding of the social and structural similarities between them and their surrounding communities. The paper then explores the potential for and limitations inherent in transplanting and testing community-level alcohol consumption interventions that have been effective on and around college campuses to the context of military installations.

## Methods

To assess the similarities and differences in alcohol use, harm, and interventions in college and military environments, the following phrases were used to capture relevant literature: “alcohol use in the military”, “alcohol related harms in the military”, “alcohol use in colleges”, “alcohol related harms in colleges”, “military sociology/culture” “college sociology/culture”, “military as a total institution”, “college as a total institution”, “reducing alcohol use in the military”, and “reducing alcohol use in college”. Literature published through June, 2015 was considered for inclusion in this paper’s analyses. Searches were conducted using PubMed, PsychInfo, and Google Scholar, as well as reviewing the references cited in articles identified through the searches. A majority of the alcohol prevalence and behavior data for the military came from the Health Related Behaviors Survey, a population-based survey that assesses trends in health behaviors among active duty and reserve

personnel. The National Survey on Drug Use and Health (NSDUH) was used for much of the prevalence data for college populations.

These data surveys, articles, and books were reviewed for comparisons of individual and organizational behavior in both alcohol consumption and prevention. Current and historical prevention efforts were also included in this paper in order to provide a broader context of the entrenchment of alcohol culture in these institutions.

In addition to military and college data, this paper builds on the sociological underpinnings of Erving Goffman's *Asylums* (Goffman, 1961), adapting his ideal type of a total institution to describe the military and colleges as strong, but not total, institutions. Critiques of the total institutions theory were also considered in order to determine additional strengths and weaknesses of applying this theory to the aforementioned organizations.

## **Results**

### **Alcohol Consumption**

Alcohol consumption patterns are similar across military and college populations, although with both populations, it is not clear the degree to which drinking is occurring while on-campus or on-installation. As described in Table 3.2, 39% of college students reported binge drinking (SAMHSA, 2014b) (defined as five or more drinks for men or four or more drinks for women on the same drinking occasion in the past 30 days), as did 33.1% of military personnel across all services (Barlas et al., 2013). These numbers vary by military service, however: Marines reported the greatest rates of binge drinking at 56.7% compared to 28.1% for the Air Force. When stratifying the military by age, 21% of underage military personnel reported binge drinking in the past 30 days; the binge-drinking rate increased to 45.4% among those 21-25 years old. Nearly 13% of college students reported heavy drinking (defined as 14 or more drinks per week on average for males and seven drinks or more per week for women) (SAMHSA, 2014b). Of the heavy college drinkers, 57% were under the minimum legal drinking age (SAMHSA, 2014a, 2014b). These numbers can be compared to 13.2% of military personnel between the ages of 21 and 25 reporting heavy drinking in the past 30

days (Barlas et al., 2013). These rates vary more when stratifying by military service: 19.7% of Marines ages 21-25 reported heavy drinking compared to 5.5% of Air Force personnel of the same age (Barlas et al., 2013). College men reported heavy drinking at nearly double the rate of military men: 16.5% and 8.5%, respectively. Women in the military reported similar heavy drinking rates in the past twelve months: 9.3% for college students and 8.3% for military women (Barlas et al., 2013; SAMHSA, 2014b). In contrast, the general U.S. population consistently reports lower rates of consumption than both college students and military populations. The only exception is heavy drinking among men, which is 9.5% among the general population and 8.5% among the military population (Barlas et al., 2013; SAMHSA, 2014a) (see Table 3.2).

[Insert Table 3.2]

The similarity of binge drinking rates between college students and active duty military personnel may reflect similarities in demographics, with both groups having a high prevalence of young, unmarried adults (Stahre et al., 2009). It should be noted that it is likely that rates across both populations are under-reported due to social desirability bias and fear of career-related consequences (Del Boca & Darkes, 2003). This may be particularly applicable to data collected by the Department of Defense (DoD), where military personnel may feel more inhibited in their responses out of fear of punishment or job loss (Gutierrez, Blume, Schmaling, Stoeber, et al., 2006). Additionally, the data presented here reflect different years of data collection and thus are not presented for direct comparison but rather to show the general similarities in consumption patterns in the two groups.

### **Alcohol-Related Consequences**

Though negative outcomes of alcohol use occur in any population with high risk or heavy drinking, there are a number of health and social consequences consistently found in both the college and military populations. These outcomes may result from similarities in the intensity and frequency of consumption between the two groups, including the similarities in demographics, behaviors, rationales, communities, and culture. As will be discussed in detail below, these groups also share similar environmental factors that contribute to excessive alcohol use. For example, driving while

under the influence of alcohol (DWI) is a commonly cited negative outcome of alcohol use and is prevalent in both populations (Ames & Cunradi, 2004; Beck et al., 2010; Bray et al., 2006; Hingson, Zha, & Weitzman, 2009). Research in both college and military populations has found high rates of DWI: 17% of 19-year-old, 20% of 20-year-old, and 25% of 21-year-old college students reported having driven while intoxicated in the past year (Beck et al., 2010), while 12.7% of active duty military personnel report having driven a vehicle after having too much to drink in the past year (Stahre et al., 2009). As a comparison, 13% of adults nationwide reporting driving while under the influence once in the past year (SAMHSA, 2006). These trends continue when discussing riding in a car driven by someone who has had too much to drink: 38% of 19-year-old, 43% of 20-year-old, and 49% of 21-year-old college students (Beck et al., 2010), and 13.7% of active duty military drinkers reported having been a passenger to a drunk or intoxicated driver (Stahre et al., 2009). These data do not make it clear whether the behavior occurred while at school or on campus versus while on vacation or elsewhere.

A review of consequences among college students found that 1,357 college students died in alcohol-related motor vehicle crashes in 2005 alone (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson et al., 2009), and 10% of college students reported being hurt or injured due to their own drinking (Wechsler, Lee, Kuo, et al., 2002). Overall, alcohol use was associated with 1,825 deaths, 690,000 assaults, 97,000 sexual assaults, and 599,000 injuries among college students, in addition to academic problems, health issues, and other risk behaviors in 2005 (Hingson et al., 2009).

A 2011 Medical Surveillance Monthly Report reported that excessive alcohol use in the military results in alcohol poisonings, domestic violence, low performance ratings, loss of promotion, attrition from service, fighting, and DWI (Armed Forces Health Surveillance Center, 2011). One study found that 57% of sexual assaults and 20% of domestic violence incidents in the Air Force involved alcohol use in 2006 (Armed Forces Health Surveillance Center, 2011), and military binge drinkers had a 68% greater likelihood of perpetrating spousal abuse as compared to those who



abstained from alcohol (Bell et al., 2006). In 2006, the Air Force reported that binge drinking was a factor in 33% of suicides and 44% of fatal motor vehicle crashes (U.S. Air Force, 2006).

The problems associated with excessive or risky alcohol use are also expensive. Estimates among college students show that the rate of alcohol-related blackouts (i.e., periods of amnesia during which a person actively engages in behaviors, such as walking and talking, but the brain is unable to create memories for the events) in emergency departments translates to approximately \$500,000 per year for a campus of 40,000 students (A. White & Hingson, 2014). A study of the economic impact of alcohol misuse among beneficiaries of the DoD's TRICARE insurance program found that the DoD spent approximately \$1.2 billion to address problems related to alcohol use in 2006: \$425 million in medical costs and \$745 million in reduced readiness and misconduct (Harwood, Zhang, Dall, Olaiya, & Fagan, 2009). These numbers are much higher than a study conducted by the DoD which found that in 1995, the DoD spent approximately \$557 million in direct health care costs related to alcohol abuse; an additional \$13 million was lost due to decreases in productivity resulting from alcohol abuse among active duty military personnel (Department of Defense, 1997). A recent study from the Centers for Disease Control and Prevention estimated underage drinking cost \$24.3 billion in 2010 in the U.S., but this estimate did not include military personnel nor did it disaggregate costs specific to college campuses (Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015).

The toll of alcohol on college campuses is relatively well-known; these data show that not only does alcohol use in the military lead to violence and negative health outcomes, but it is also responsible for deaths among U.S. service members.

Having established substantial similarities in the prevalence of alcohol use and related consequences between the two institutions, this paper will now examine some of the risk factors contributing to these problems; specific interventions for each level of the socio-ecological model (individual, peer, organization, and community); and the degree to which those interventions that have been effective on college campuses could be transferred to military settings and communities

## Individuals

### *Risk Characteristics*

These two strong institutions play significant roles in the development of drinking identities among individuals. Within both the military and collegiate contexts, many individuals are entering a liminal, transitioning period and developing an identity separate from their parents or families. Goffman argues that those who are a part of a total institution lose their identity through the systematic breaking down of the self into one shared, collective identity.

There are several similarities in the college and military identity formation processes that can lead to the development of a “drinker identity,” and some college and military identities incorporate drinking behavior into their activities and norms. Students at a particular college or in a particular military unit adopt collective norms around drinking that are part of that college subgroup or military unit’s identity. In both settings, the demands of the institutions create highly stressful situations and can encourage risk-taking and sensation-seeking behavior in order to cope with that stress. Sensation-seeking, including a willingness to take social, physical, and financial risks for arousal, has been associated with higher levels of drinking (Hittner & Swickert, 2006). Sensation-seeking behavior has been seen in college students (Borsari, Murphy, & Barnett, 2007) but is also a fundamental characteristic of military personnel (Bray et al., 2009). The characteristics that make an individual a good soldier may also put him or her at higher risk of alcohol use (Jones & Fear, 2011).

Stress has been recognized as another risk factor for excessive alcohol use. Researchers have found that college students find different ways to cope with stressors and negative emotions experienced while on campus, and heavy drinkers are more likely to drink with emotional pain than lighter drinkers (Borsari et al., 2007; Ichiyama & Kruse, 1998). One study found that 37.6% of college students reported drinking alcohol to cope with stress, anxiety, or depression (C. L. Park & Levenson, 2002). Elevated stress is also correlated with higher rates of substance use and dependence among both veterans and active duty military personnel (Bray, Fairbank, & Marsden, 1999; Kulka et al., 1990), suggesting that this is a “learned behavior” among military populations: 23.5% of active duty personnel in 1999 reported coping by having a drink frequently or sometimes, with men more

likely to report drinking to cope than women (17.1% and 6.9%, respectively). Those reporting high stress were 1.4 times more likely to report heavy alcohol use in the past month than those reporting lower stress levels (Bray et al., 1999).

The role of masculinity and drinking patterns in these populations is also similar and encouraged by the institutions. Much of the alcohol use in both colleges and the military is male dominated, male identified, and male centered (Capraro, 2000; West, 2001). Being in the military shapes and informs constructs of masculinity (Peralta, Tuttle, & Steele, 2010), which is in turn associated with higher levels of drinking (West, 2001). In both the military and on college campuses, particularly in fraternities, alcohol contributes to male bonding behaviors and group cohesions (Arnold & Kuh, 1992; West, 2001).

### ***Interventions***

Historically, both colleges and the military have worked to decrease high risk drinking by increasing alcohol education as part of the classroom and military curricula and training, using such tools as the online information program AlcoholEdu for first year college students or Alcohol Awareness Month in the Army (Aldridge-Gerry et al., 2012; Babor et al., 2007; Brown et al., 2010; Cucciare, Darrow, & Weingardt, 2011; Larimer & Cronce, 2007). In the case of college students, alcohol education is taught in many orientation programs for first year students (Croom et al., 2009); for military personnel, alcohol education is included in regular mandatory briefings (Bray, Marsden, Herbold, & Peterson, 1992; Gibbs & Rae Olmsted, 2011). Colleges have also sought to implement improved screening and brief intervention for alcohol abuse or dependence (Ahmadi & Green, 2011; Bartone et al., 2012; Cucciare et al., 2012; Larimer & Cronce, 2007). These approaches rely heavily on education and counseling, which have shown only moderate effectiveness in reducing rates of alcohol consumption, particularly among 18-24 year olds (Larimer & Cronce, 2007; Whitlock, Polen, Green, Orleans, & Klein, 2004). With regard to SBIRT (Screening, Brief Intervention, and Referral to Treatment), brief motivational interviewing has been shown to be effective in leading to short-term reductions in alcohol use and related harm in both college and military settings (Fernandez,

Hartman, & Olshaker, 2006; Institute of Medicine, 2012; Larimer & Cronce, 2007); a review of 56 interventions found consistent support for brief motivational interviews that provide personalized feedback or personalized normative feedback (Larimer & Cronce, 2007).

Evaluation of the Brief Alcohol Screening and Intervention of College Students (BASICS) program found that students involved in BASICS training reported consuming 1.5 fewer drinks per week and a 13% decline in alcohol problems over a twelve month-period when compared to students who did not receive BASICS (Fachini, Aliane, Martinez, & Furtado, 2012). However, BASICS screening is far from routine on college campuses, and one study of college students found that fewer than 14% of those who drank more than four drinks on an occasion for men and three drinks for women were asked about their alcohol consumption by a medical provider (Hingson, Heeren, Edwards, & Saitz, 2012). The military also has implemented screening programs to provide and encourage screening, such as the DoD-sponsored web-based Military Pathways program that makes private, online SBIRT services available to all military personnel (Military Pathways, 2012). Though the VA/DoD Clinical Practice Guidelines and policies support SBIRT as an evidence-based practice to reduce high risk alcohol consumption, SBIRT protocols have not been implemented in all military primary care programs (Institute of Medicine, 2012).

Electronic Screening and Brief Intervention (E-SBI), which uses electronic devices, including computers, telephones, and mobile devices, to provide personalized feedback based on a series of screening questions, is another evidence-based approach that may have higher uptake as it is less expensive and can be more confidential than SBIRT delivered in person. Though no published research has tested the efficacy of E-SBI in colleges or the military, brief motivational interviewing programs that involve web-based screening and personalized feedback tested in both colleges and the military have shown promising results (Hester, Squires, & Delaney, 2005; Pemberton et al., 2011; Walters, Vader, & Harris, 2007). The Guide to Community Preventive Services recommended the implementation of E-SBI in both colleges and the military (Guide to Community Preventive Services, 2012). Experts believe that web-based screening may encourage more college students and

military personnel to utilize the service when they fear retribution and being kicked out of their institution (Borsari et al., 2007; Pemberton et al., 2011). Additionally, Harwood et al. found that the implementation of E-SBI would save the U.S. military \$136 million each year in reduced healthcare costs and increased productivity (Borsari et al., 2007; Harwood et al., 2009).

To the degree that none of these programs address what the institutions are doing to shape drinker identities, it is not surprising that their effectiveness is limited. Moving from individual behavior to network and community influences may yield greater impact.

## **Peers**

### ***Risk Characteristics***

Relationships between peers can support or prevent high-risk drinking. If hazardous drinking is acceptable in a social environment, individuals may be less likely to see their own drinking as a problem or be motivated to change their behavior (Ames et al., 2007; Foran et al., 2011). Young men and women who are looking for affiliation and camaraderie drink more heavily than those who are not; this bonding experience is prevalent in both military and collegiate settings (Ames, Cunradi, & Moore, 2002; Hartzler & Fromme, 2003), and research has found that students who belong to a Greek organization are more likely to have more tolerant views on alcohol consumption (Klein, 1992). The long history and tradition of alcohol use within college and military environments has created similar cultures that promote excessive alcohol use. For many college students, drinking is heavily influenced by the presence of a fraternity and sorority system, athletics, and on-campus housing, where there is a high density of student residents (Presley et al., 2002). A sense of affiliation and camaraderie among students and military personnel breeds a culture of high risk drinking and negative outcomes (Ames et al., 2007; Presley et al., 2002).

The interactions and relationships between individuals within each institution create sets of drinking expectations that are not always accurate. Though alcohol norms and expectancies have not been comprehensively studied in the military, research shows that college students consistently think that their peers are drinking more often and higher amounts of alcohol than they actually are; they also believe that their peers are more accepting of alcohol than is accurate (Perkins, Haines, & Rice,

2005). The perception of higher alcohol use among peers is a predictor of personal alcohol misuse (Perkins & Wechsler, 1996), and one study found that perceived norms are more powerful predictors of alcohol use than race or sorority or fraternity membership (Perkins et al., 2005). The limited data available on perceived norms in the military found that Navy personnel's perceptions of whether peers, friends, or coworkers would approve or disapprove of drinking during shore leave and how many drinks these peers would have when they usually drank were significantly associated with heavy drinking on leave (Ames & Cunradi, 2004).

### ***Interventions***

Both colleges and the military have invested much of their prevention efforts in social norms interventions aimed at changing the perceived drinking norms within their institutions. Evaluations of personalized normative feedback interventions, such as programs focusing on reducing the overestimation of peers' alcohol consumption, have found significant reductions of alcohol problems after the completion of programs that use web or computer feedback. Face-to-face feedback showed reductions in frequency of drinking and related harms at 17 month follow-up (Moreira, Smith, & Foxcroft, 2009). However, a national evaluation of social norms campaigns (defined as information to correct misperceptions about levels of alcohol consumption in peer groups (Moreira et al., 2009) on 37 college campuses found that these interventions did not decrease alcohol use among students, and monthly alcohol use and total volume of alcohol consumed actually increased at these schools (Wechsler et al., 2003).

The DoD-funded "That Guy" campaign works to promote knowledge about negative consequences that result from excessive drinking, with the overall goal of encouraging young enlisted personnel to reject binge drinking (That Guy, n.d.). The campaign focuses on "that guy" (or girl) who is clearly intoxicated and "loses control", embarrassing himself and those around him, and emphasizes that being "that guy" detracts young, enlisted personnel from the things they care about most, including family, friends, dating, sex, money, and reputation (That Guy, n.d.). The campaign includes an interactive website, offline advertising and promotions, public service announcements,

and branded collateral products, including posters, playing cards, t-shirts, and more (see Appendix B). This approach aims to reach the population as a whole, not just identified high-risk drinkers. To date, results from any program evaluation have not been released, and a study of alcohol use in the U.S. Navy found that “occupational influences”—such as the use of alcohol to reward hard work, ease interpersonal tensions, and promote unit cohesion and bonding—may be barriers to alcohol de-glamorization programs (Ames et al., 2007) such as “That Guy”. Similarly, studies of social norms campaigns implemented on college campuses have reached mixed conclusions, with several finding norming campaigns ineffective at reducing alcohol use (DeJong et al., 2006; Toomey & Wagenaar, 2002; Wechsler et al., 2003). The reality of the “occupational influences” speaks to a need for a more structural and institutionally-entrenched approach to the reduction of high-risk drinking.

## **Organizations**

### ***Risk Characteristics***

Strong institutions, as defined in Goffman’s work, exemplify their strength in part through the organizational structures that simultaneously support and regulate the use of alcohol. The establishment of a drinking culture, often an excessive one, and the interventions utilized to counteract such a culture help to shape the identities of the individuals developed within colleges and the military. This idea is not a new one: a 1976 study found that while many individuals abstain from alcohol or do not misuse alcohol, college environments are powerful enough to influence nearly everyone’s alcohol behavior (Moos, Bromet, & Brownstein, 1976) and, by extension, influence the creation of an identity as a high-risk drinker. In a study of alcohol use in fraternities, Arnold and Kuh also point out that involvement in a fraternity, and the alcohol use that comes with it, are part of a rite of passage into manhood (Arnold & Kuh, 1992); a similar argument is made in the military. Alcohol is often available at social functions, and surveys of students have found that students think college is a place to drink excessively (H. R. White & Jackson, 2004; H. R. White et al., 2006).

Similarly, there is a strong history of drinking rituals in the military, including toasting, buying rounds, celebrations, rowdiness, and heavy drinking during periods of freedom or free weekends (Ames et al., 2007; Hlad, 2012). As early as 1984, researchers noted that the military not

only tolerated, but may actually have encouraged, excessive alcohol use among its personnel (Dunbar-Miller, 1984), including having only alcoholic beverages at official events (Hlad, 2012), selling alcohol at deep discounts on installations (Brennan, 2012; Institute of Medicine, 2012), and informal rules that expect recently promoted officers to buy “rounds and rounds of beer” to build a sense of camaraderie and military identity (Hlad, 2012). Within the military, alcohol is thought to have a positive effect in building camaraderie, bonding, and confidence, as well as in helping individuals cope with war-related stressors (Holmes, 1986).

Fraternities and military boot camps both have initiation rites of passage that reinforce masculinity and alcohol use (West, 2001). Collegiate Greek life is the embodiment of a strong institution on a college campus. The pledge period is similar to boot camp, as individuals are limited in how much contact they can have with non-members, are forced to form tight bonds and groups with those also pledging, are required to learn the house rituals, and must demonstrate loyalty to their organization above others. Additionally, alcohol is frequently used to foster bonding and help create the shared identity as a sorority sister or fraternity brother (Arnold & Kuh, 1992; Capone, Wood, Borsari, & Laird, 2007; Kuh & Arnold, 1993). Many of these characteristics are true of military boot camp as well. Additionally, institutions routinely mandate that young adults live with someone other than a spouse, as is often the case in dormitories and Greek houses or military barracks. Data suggest that when this occurs for young adults they are more likely to engage in alcohol consumption than those living alone (Capone et al., 2007; A. Park, Sher, Wood, & Krull, 2009).

Goffman’s total institution framework manifests itself in the degree to which alcohol is integrated into the daily life of those within the institution and is consistent in both college students and soldiers. This includes the quantity of alcohol consumed as well as how and when it is consumed. Commonly cited as the ethos of college campuses, “work hard, play hard” justifies the behavior of students who spend their days studying and in class and their nights drinking heavily (Parker & Williams, 2003). They repeat this cycle regularly throughout the week (Dowdall, 2008; Hughes, Anderson, Morleo, & Bellis, 2008). This mentality is also pervasive in the military context,



where drinking is expected – it is an element of camaraderie, bonding, and military life. Recently promoted officers are expected to purchase rounds of alcohol for other officers in their command at local bars and commanders buy rounds to build camaraderie among the troops (Hlad, 2012). This behavior is thought to promote bonding, establishes relationships between and across military rank hierarchies, and has been institutionalized in military culture.

In colleges and the military particularly, alcohol use is subject to regulations and judgments by the institution itself. For example, these institutions formally reiterate the prohibition of alcohol consumption under the minimum legal drinking age of 21. On many college campuses, no alcohol is allowed in the dormitories; on military installations, alcohol is typically not allowed in the barracks. No alcohol use is allowed during boot camp in the military, and those with a lower rank have fewer privileges for drinking during the week or having weekends off. Colleges institute similar regulations governing when and how a student can drink (e.g. sponsoring events where alcohol is sold with price promotions on campus, but banning kegs of beer at events). The highly structured schedule and demands of collegiate life often push drinking to an institutionally and culturally accepted three-day drinking weekend: Thursday, Friday, and Saturday.

The military also regulates and structures drinking as part of the institution itself. One military sociologist noted that “all institutions depend on the interaction of their members who are guided by informal customs and procedures, as well as explicit, written norms...creating discrepancy between underlying assumptions and formal rules” (16) (Wilson, 2008). For example, the Army designed a formal “Dining-In” event to introduce new lieutenants to a given service’s procedures and customs. The Army describes this event as an “assemblage of the officers of a unit on a social basis, fostering esprit de corps and unit pride” (United States Army, 1983). During this bi-annual assemblage, three separate events involve alcohol (cocktail hour, toasts during dinner, and after-dinner drinks). Throughout the meal, the Army instructs event leaders to use an alcoholic beverage to represent each significant event in the Army’s history (United States Army, 1983). Many units still

continue the “dining-in” tradition, including a “mess night” in the Marine Corps where Corpsmen are expected to drink an alcoholic “grog” during dozens of toasts (Hlad, 2012).

These traditions are embedded within the organizational norms of the institutions and occur both on and off the campus or base. However, the high levels of drinking and related problems in both institutions suggest a need for new approaches for both college campuses and the military. Cultures and practices in both settings encourage and structure drinking patterns and behavior. Traditional programs that emphasize individual behavior change, such as social norms campaigns – and that do not incorporate a focus on the institutional settings as well as the communities and environments surrounding these institutions – are unlikely to be effective in reducing alcohol consumption and related harms (Scribner et al., 2011).

### ***Interventions***

Intervening at the organizational level may have a greater impact on college students and military personnel than on the general population due to the ability of strong institutions to control the conditions in which drinking decisions are made. For example, advertising helps to create and support normative environments. The impact of alcohol advertisements and promotions on and around college campuses has been studied at length, and a number of interventions have been implemented to mitigate this risk factor. One study of more than 700 college administrators found that 50% of colleges prohibited alcohol advertisements in the campus newspaper (Wechsler, Lee, Kuo, et al., 2002), although first amendment challenges have begun to chip away at these restrictions (Jaschik, 2010). The removal of alcohol sponsorship from college sporting games and events and the removal of all billboards or flyers that advertise reduced prices or “college nights” from college campuses are some of the strategies implemented to effectively reduce excessive alcohol use on college campuses (DeJong et al., 1998; Erenberg & Hacker, 1997b; Kuo et al., 2003). These same strategies may be translated to military installations with equally positive results.

As strong institutions, colleges and the military can further influence behavior by using their power to control behavior within the organization (i.e., on-campus or on-base) by implementing

evidence-based policies in those locations. For example, one of the most powerful determinants of drinking is the price of alcohol (Wagenaar et al., 2009). The military can influence prices directly in on-installation commissaries, where currently alcohol may be discounted by 5% to 10% as compared to the cost of alcohol in the surrounding town, in addition to being tax free (Department of Defense, 2005). There have been no studies that explore why the DoD allows prices to be lower for these products, but the literature consistently shows that as the price of alcohol increases, consumption decreases (Chaloupka, Grossman, & Saffer, 2002).

## **Community**

### ***Risk Characteristics***

Institutions are not created or sustained in a vacuum, and a number of theories have been posited to explain the development of strong (or total) institutions. Wilson (2008) argues that each institution, whether college or military, must define and establish a relationship with its surrounding community, and the broader society. It is difficult and insufficient to analyze the actions of soldiers or students without evaluating both the campus or installation and their surrounding communities; as Sanford (1962) pointed out: “If we are interested in understanding the institution, we must identify and appreciate how the external environment shapes the institution” (73) (Sanford, 1962). As colleges and the military are both strong, but not total, institutions, both students and soldiers have the ability to drink alcohol on- and off- campus or installation. As the one environment becomes more restrictive, individuals may begin to engage in dangerous behavior at the other, suggesting a need for the institution to work closely with the surrounding community to reduce the overall risk environment. Identities formed and supported by the institutions are then acted out and reinforced by cues from outside the institution. Students and soldiers receive messages about alcohol from a number of sources and competing interests from on and off the campus or installation (Presley et al., 2002), and students and military personnel have taken note of the alcohol environment surrounding their institutions. For example, one 22-year old sailor observed that anywhere there is a Navy base, there will be a strong drinking environment (West, 2001):

I go to this fort in Louisiana and it's like out in the woods. You take this road and all of a sudden there's like a little town and it's all bars. I think that's pretty much how it is in every place because, I mean, it's like a tradition. You know, the sailor goes out, been at sea for this many months, and he goes out and he gets drunk.

Additional components of the alcohol environment are the promotion and price discounting of alcohol. Decades of studies have recognized the impact of the quantity and content of alcohol advertising on and around college campuses, including storefront advertising, advertising in collegiate publications, promotions of alcohol industry-sponsored events on or near campus, and deep discounting aimed towards college students (Scribner et al., 2011; Vicary & Karshin, 2002; Wechsler & Nelson, 2008). A study of 118 college campuses found that nearly three-quarters of the bars near campus offered price specials on the weekends, and nearly 60 percent of the liquor stores offered at least one beer promotion, often targeted directly to college students (Kuo et al., 2003). These promotions were associated with higher binge drinking rates among college students (Kuo et al., 2003). Bars near military installations also promote specials or deals that provide large quantities of alcohol for a cheaper price than offered to the general population (Ames & Cunradi, 2004). These promotions target military personnel, offering, for example, two-for-one drinks when a military ID is shown, or offering pitchers of beer for a highly reduced price (R. S. Moore, Ames, & Cunradi, 2007).

Military-specific marketing can be seen in drinking environments near military installations, but such marketing has not been studied or linked to alcohol consumption patterns in these settings. While there are many differences between alcohol and tobacco, both are legal products; their use in adolescence and young adulthood can lead to other problems later in life (DeWit, Adlaf, Offord, & Ogborne, 2014; Hanna, Yi, Dufour, & Whitmore, 2001). Because of this, there is a general consensus that young populations should not be targeted by marketing for these products. There is a substantial literature showing the effects of alcohol marketing on young people's drinking (Anderson et al., 2009; L. A. Smith & Foxcroft, 2009). While there is no evidence available on military targeting by alcohol companies, tobacco promotions and sponsorships in the military have been studied at length, and the research has found a long history of tobacco companies targeting military personnel. Reviews of

tobacco documents demonstrated that R.J. Reynolds created shelf-display plans specifically for Navy exchanges and sponsored military bar and music events and (Arvey & Malone, 2008; Joseph, Muggli, Pearson, & Lando, 2005; E. A. Smith & Malone, 2009).

Military sociologists have argued for decades that there needs to be a convergence between the values of mainstream society and the values of military institutions (Janowitz, 1961), suggesting the need for more interventions that bring together the institution and the surrounding environment to create a shared goal of reducing risky alcohol consumption. These data make it clear that the environments around both college campuses and military installations can influence high-risk drinking in both populations. The relationship between the institution and community requires the installation or campus and surrounding community to work together to reduce the risk each environment can pose for the other.

### ***Interventions***

Research has demonstrated that community-level environmental strategies are highly effective in reducing alcohol-related problems by focusing on the social, political, and economic contexts in which alcohol problems occur (Treno & Lee, 2002). The U.S. Preventive Services Task Force and the Community Preventive Services Task Force have recommended the integration of clinical and community-based preventive strategies across multiple levels of what is known in public health as the Socio-Ecological Model (McLeroy et al., 1988). This approach impacts the greatest number of people, thus increasing the potential for reductions in consumption at the population level (Ockene et al., 2007). These recommendations focus on community and policy-level changes to reduce high-risk alcohol consumption and related harms (Zaza et al., 2000). Research in the civilian population indicates that focusing on community-level influences – including alcohol outlet density (i.e., the number of liquor stores and bars around a military installation or campus), prevalence of alcohol advertising and specific promotions targeting a population, and the price of alcohol – leads to an alternative set of evidence-based interventions that can be used to complement counseling and other individual-level approaches. Because these strategies target environments and the cues they

provide for individual behavior, they can also affect the development of drinker identities associated with the two institutions, as well as condition how those identities may be acted out.

There are four key factors shaping the alcohol environment surrounding college campuses and military installations that influence the development of high-risk drinker identities: *place*, i.e. where alcohol outlets are located, how close they are to one another and other areas of interest such as school or military installations; *promotion*, such as alcohol advertisements in magazines, on billboards, in newspapers and on television; *product*, including the design and packaging of beer, wine, liquor and distilled spirits, as well as alcoholic test tube shots, Jell-O shots, alcopops (e.g., Mike's Hard Lemonade, Smirnoff Ice, etc.), and more; and *price*, including alcohol taxes, discounting, 2-for-1 deals, happy hours, and more (Cowan & Mosher, 1985). These factors also constitute points of intervention that provide opportunities to influence patterns of high risk and underage drinking among military and college populations by reducing the access to and availability of alcohol immediately surrounding the institutions.

There are a number of articles that discuss specific interventions for each of these factors. While all are important, this section will focus on alcohol outlet density as one example of how an environmental strategy around military installations could be modeled after an evidence-based college intervention. This policy has strong evidence of effectiveness in reducing alcohol consumption among the general public and populations similar to the military (Campbell et al., 2009). It is cost effective and sustainable, as once the policy is implemented it does not require a constant funding stream for it to remain in place and does not require substantial time from city officials or law enforcement to ensure compliance (M. Sparks, Jernigan, & Mosher, 2011). The strong endorsement from the CDC as an effective measure to reduce alcohol consumption and related harms (Campbell et al., 2009; Scribner et al., 2008; Zhang, 2015) and support from the Institute of Medicine (Institute of Medicine, 2012) also speak to its importance and value; similarly, the abundance of step by step manuals and available guidance make this a feasible policy intervention.

Alcohol outlet density is defined as the number of alcohol outlets in a given area (Campbell et al., 2009) and is associated with higher rates of alcohol consumption (Toomey et al., 2007). There are numerous studies of alcohol outlet density on and around college campuses (Kypri et al., 2008; Scribner et al., 2008). One study of outlets located in a college community found between 32 and 185 alcohol outlets within a two mile radius of the college campus (Weitzman et al., 2003). The number of alcohol outlets was significantly correlated with heavy off-campus drinking for all drinkers surveyed (Weitzman et al., 2003). Limiting alcohol outlet density has been recommended as an evidence-based strategy for reducing alcohol consumption broadly (Campbell et al., 2009) and drinking on and around college campuses specifically (NIAAA, 2015). There are 13 states that have some type of restriction on alcohol outlet density near colleges and universities, 11 of which apply to both on and off-sale establishments (SAMHSA, 2015).

There have been few studies of outlet density in communities surrounding military installations, but findings from qualitative studies and anecdotal reports suggest similar high-density environments. One study found on- and off-sale alcohol establishments in great supply: many military installations have a “strip” of bars, clubs, and liquor stores right outside the main gate to the base (R. S. Moore et al., 2007). Moore and colleagues argue that it is not only the close physical proximity of establishments that encourages off-base alcohol consumption, but being able to see the bright lights from the base, and the presence of military-specific promotions in these outlets (R. S. Moore et al., 2007).

Alcohol outlets are best understood as another institutional context that influences drinkers and drinker identities. This “institutional” approach to the prevention of alcohol-related problems (Mosher & Jernigan, 1989) dovetails well with a strong institutions approach to developing college and military interventions. As strong institutions, colleges and the military have unique abilities to influence the communities around them. Further research is needed to explore fully the relationship between alcohol outlet density and excessive alcohol consumption and consequences in military

communities in order to implement the types of interventions proven successful in the college literature.

## Discussion

Price, place, product, and promotion work together to create intoxicogenic environments, where drinking to intoxication is the norm (McCreanor, Barnes, Kaiwai, Borell, & Gregory, 2008). Kuo et al. found that college campuses with more nearby on-sale establishments promoting weekend price deals had higher binge drinking rates than college campuses surrounded by on-sale establishments with fewer promotions (Kuo et al., 2003). Yet intervening off-installation or off-campus is challenging for the institutions, leaders of which may not feel that they have direct authority over the behaviors or practices of businesses not under their control. Therefore, in order to mitigate risky behavior off-campus or installation, many institutions focus on educating their soldiers or students on the harms of excessive alcohol use, rather than intervening to address environmental risk factors, as described above. There are larger societal influences that shape individual behavior, and intervening on environmental characteristics may be more sustainable and wider reaching than focusing on individuals alone (Gmel, Rehm, & Room, 2004; Rose, 2001).

Researchers studying alcohol use in the military have suggested the implementation of broader policy and environmental prevention strategies to complement the prevention efforts already undertaken by the DoD (Ames & Cunradi, 2004; Ames et al., 2002; Stahre et al., 2009). College researchers have made the same argument given the individually focused efforts of most college campuses (Kuo et al., 2003 ; SAMHSA, 2015; Toomey et al., 2007). Interventions that reduce access to alcohol, particularly among those living on campus or base housing, could substantially reduce binge drinking in these populations (Stahre et al., 2009).

There are a number of effective interventions to reduce underage and excessive alcohol consumption in the college environment, many of which are discussed above. Despite the similarities between the college and military environments, little has been done to adapt these evidence-based interventions to the military community. One program adapted the Enforcing Underage Drinking



Laws (EUDL) program to Air Force bases, and worked with community coalitions to reduce the alcohol risk environments. These interventions included reducing the social availability of alcohol through shoulder tap programs (where law enforcement use minor decoys to ask strangers to purchase alcohol for them); conducting compliance checks to reduce sales to minors (sending decoys in to purchase alcohol without identification); and using media campaigns to raise awareness of drinking use and harms. Air Force bases in the study generally saw greater decreases in heavy drinking than their respective comparison site, with one base seeing a 13.6% decrease in problem drinking (Spera et al., 2012). However, this is the only published study to date that implements and evaluates strategies targeting alcohol accessibility around military installations to reduce high-risk drinking.

### **Addressing Institutional Barriers to Implementation**

Despite the evidence that recommends environmental strategies to reduce high-risk drinking, these interventions consistently face opposition from other major institutions. One of the greatest barriers to implementation is the alcohol industry, including manufacturers, distributors, and sellers, who work to promote the sales of their products. In 2013 alone, organizations representing the alcohol industry (e.g., National Beer Wholesalers of America, Wine and Spirits Wholesalers of America) spent over \$21 million on federal lobbying to ensure that any policies passed represented the interests of the industry (Opensecrets.org, 2013).

The general business community may also oppose public health-oriented alcohol control policies because these policies have the potential to reduce purchases of alcohol and even shut down alcohol outlets, and can be viewed as threatening economic prosperity. This opposition can be countered with the argument that increased tax revenue from higher alcohol taxes can be put back into the community or the base. Addressing alcohol outlet density means that outlets that sell alcohol must diversify their businesses, either by reducing their dependence on alcohol sales or shifting to new lines of business.

These institutions often base their arguments in an ideological stance about individual liberties, arguing for instance that the government cannot infringe on an individual's right to purchase and consume alcohol. This is often one of the greatest challenges to implementing environmental interventions. The common refrain of the “nanny state” is heard in protest against the implementation of many environmental strategies (Boaz, 2009; Harsanyi, 2007).

However, because colleges and the military are strong institutions, they may be uniquely positioned to counter the institutional challenges described above. Many campuses have in fact implemented a number of environmental approaches that have been successful in reducing high-risk alcohol consumption among students (Saltz et al., 2010; Weitzman, Nelson, Lee, & Wechsler, 2004; Wolfson et al., 2012). It can be hypothesized that military installations can both utilize the lessons learned from college campuses and capitalize on their strong positions within their communities to implement similar strategies.

## **Limitations**

There are limitations to the application of Goffman's theory of total institutions to both colleges and the military. In a total institution, the ability of the institution to control the behavior of its constituents is a defining factor. While the military exhibits many facets of a total institution – it is a highly structured, hierarchical organization that functions through a command system, access is limited, and some personnel have restrictions on when they can and cannot leave base - it, in fact, does not have the behavior of its personnel or the external alcohol establishments under complete control, or under optimal control from a public health standpoint. If the military is truly a total institution with the ability to control behavior, why is excessive alcohol use still so prevalent? Why is the institution unable to simply ban excessive alcohol use, or driving under the influence, or any of the other high-risk activities related to alcohol consumption? On the one hand, this limited influence undercuts the argument for these as total institutions (which is reflected in this paper by the use of the term “strong institutions” instead); on other hand, these institutions may not want to fully control alcohol consumption because the bonding created through the creation of drinking cultures

is itself part of the way these institutions exert their influence on individuals within them, and because excessive alcohol use may also play a useful function as self-medication for the stress of school or work on college campuses, and for the trauma of deployment and war-time exposure in the military (Hlad, 2012).

There also remain differences between colleges and the military that limit this comparison. As noted above, the military is a much more hierarchical institution that enacts more control over its population than colleges; college students have more freedoms and less structured days than their military counterparts. The alcohol culture and environments surrounding college campuses may be higher risk than military installations as college students are more free to engage with the alcohol establishments on and around their campuses. Differences such as these in the degree of institutional control, and how these differences manifest in the creation and regulation of communities around the institutions, are difficult to measure and thus are not reflected in this paper.

Additionally, the data presented in this paper are not directly comparable to one another due to differences in reporting years, recall periods, and variable definitions. For example, heavy drinking is defined differently in different surveys, and the period of time measured in a question also varies. Prevalence and harm data are likely underreported due to fear of consequences, particularly for military personnel (Del Boca & Darkes, 2003). While the literature included in this paper is comprehensive, additional studies on these topics may have been published since the time of writing that would provide more current data or an additional perspective on the issues presented. Finally, no explicit inclusion or exclusion criteria were pre-determined at the outset of the literature review; hundreds of articles were reviewed and were included or excluded based on relevance to the subject matter and recency of data collection, if applicable.

## **Conclusion**

The research summarized here suggests that the environments surrounding college campuses and military installations contribute similarly to the development or reinforcement of drinker identities and resulting alcohol-related consumption patterns and negative health outcomes

experienced by the individuals in each of those institutions. These findings are important as specific interventions have been successfully implemented in college communities, but few studies have applied similar models to communities surrounding military installations. While this paper begins to compare the military and college settings, there continues to be a paucity of data on the military environment. The information presented here suggests a need to collect institutional-level data on place, price, promotions, and products on and around military installations to facilitate adaptation of the environmental strategies proven in the college setting to the military context. There is also a need to pilot the most promising strategies on college campuses, which tend to be strategies targeting environments (NIAAA, 2015) in military communities in order to test their transferability and effectiveness in reducing the underage and excessive drinking that leads to the harms and consequences described above. The high levels of similarity between these two strong institutions suggest that the college experience with environmental strategies to reduce excessive drinking can be instructive for military efforts. Future research should explore methods and the effectiveness of engaging military institutions and the communities that surround them in reducing alcohol-related harms.

**Table 3.1: Application of Goffman's Total Institution Theory to Colleges and the Military**

Characteristic of a Total Institution	Application to colleges	Application to military
Every activity an individual carries out is done in the presence of a large group of others.	College students often live in shared dormitories and shared off-campus housing and engage in most of their activities together, including going to classes as well as university-structured extra-curricular activities.	Military personnel are constantly surrounded by other soldiers and leadership, including in the barracks and during training exercises.
All phases of the day are tightly structured.	Colleges structure (and can control) class schedules, academic calendars, and at least to some extent, extra-curricular activities.	The military structures a soldier's day, with drills, physical excursions, briefings, and other activities.
Daily events are all built around a larger institutional goal.	Classes and other activities are oriented to academic success and graduation.	Drills and skills training, as well as bonding activities, are oriented to combat readiness or military strategy.
Entry into the institution entails shifting from an individual to a shared group identity.	Students at a college become alumni for life, with an attendant identity and sub-identities, including dormitory or residential affiliations, sports teams or clubs, fraternities or sororities, etc.	Developing a shared identity is a fundamental tenet of basic training, which stresses the importance of camaraderie and "brotherhood" for safety and military success. Sub-affiliations are also developed with one's unit or service.

Table 3.2: Alcohol Consumption Patterns, College and Military

	College (SAMHSA, 2014b)	Military (Barlas et al., 2013)	United States Population (SAMHSA, 2014a)
<b>Binge drinking* – Overall Population</b>	39.0%	33.1%	22.9%
<b>Binge drinking- Men</b>	44.8%	34.8%	30.2%
<b>Binge drinking-Women</b>	33.9%	24.6%	16.0%
<b>Heavy Drinking**</b>			6.3%
<b>Heavy Drinking-Men</b>	16.5%	8.5%	9.5%
<b>Heavy Drinking - Women</b>	9.3%	8.3%	3.3%
<b>Heavy Drinking - 18-20</b>	12.7%	5.7%	3.7%***
<b>Heavy Drinking - 21-25</b>		13.2%	6.7%****
<p><b>*Binge Drinking:</b> five or more drinks for men or four or more drinks for women on the same drinking occasion on at least one day in the past 30 days</p> <p><b>**Heavy drinking:</b> 14 drinks or more per week on average for males and seven drinks or more per week for women in the past 12 months (Barlas et al., 2013) or five or more drinks in the same occasion at on the same occasion on each of 5 or more days in the past 30 days (SAMHSA, 2014b)</p> <p>***SAMHSA reports heavy alcohol use for ages 12-20</p> <p>****SAMHSA reports heavy alcohol use for ages 21+</p>			

## Chapter 4 : Alcohol Outlet Density around Military Installations in Eight U.S. States

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**Keywords:** Military, alcohol outlet density, alcohol, substance use, health, college

### Abstract

**Introduction:** Excessive alcohol use is prevalent in the military and is associated with a number of physical, mental, social, and economic harms, including depression, violence, and reductions in combat readiness. The Guide to Community Preventive Services has endorsed limiting alcohol outlet density (AOD) as an effective strategy for reducing alcohol use and related harms.

**Methods:** Alcohol outlet densities around a sample of 23 military installations in eight states were calculated at one, two, and five mile radii. Geocoding using ArcGIS produced spatial matches for 98-100% of licensed outlets for each state for a total of 212,068 establishments selling alcohol for consumption both on- and off-sale. **Results:** The data presented here suggest that, in more than half the states examined, the density of off-sale alcohol outlets decreased as proximity to the installation decreased; this was also the case for on-sale outlets in three of the states analyzed. **Conclusion:** This analysis identified that, at least in some states and for some large military installations, alcohol outlet density increases near the installations, as has been the case for college populations. Future studies could use military personnel alcohol consumption and related harms data to analyze the relationship between alcohol outlet density and alcohol-related problems in military populations. Given the similarities between military installations and colleges, interventions to reduce alcohol outlet density that have been found to be effective for college environments (such as zoning ordinances and conditional use permits) may also be effective at reducing alcohol outlet density around military installations.

## Introduction

Excessive alcohol use is the leading cause of death and disabilities among 15- to 24-year-old males in every region of the world except the Eastern Mediterranean, and among females in developed countries (Gore et al., 2011). Alcohol consumption is prevalent in the United States (U.S.), especially among 18- to 24-year-olds. In 2013, 39% of U.S. college students reported binge drinking (SAMHSA, 2014b) (i.e., five or more drinks for men or four or more drinks for women on the same drinking occasion in the past 30 days), as did 33.1% of U.S. military personnel across all services in 2012 (Barlas et al., 2013).

Excessive alcohol use in the military and its related harms, including effects on job performance, injury, and criminal justice issues, affect both soldiers and their families (Stahre et al., 2009). In addition, excessive alcohol use poses a risk to national security by making soldiers and their units less combat-ready (Federman et al., 2000). Excessive alcohol use also affects cognitive functioning, which may influence decision-making, response time, and mental alertness, qualities that are crucial to a combat-ready soldier (Federman et al., 2000). One study found that heavy drinkers were more likely to report low productivity over a twelve-month period as compared to those who drink less (Fisher, Hoffman, Austin-Lane, & Kao, 2000). In sum, alcohol consumption and related consequences are fundamentally counter to the “Ready to Deploy” mission of the Department of Defense (Ahmadi & Green, 2011).

One approach to reducing excessive alcohol consumption and related harms is to reduce alcohol outlet density. Studies that have assessed the association between alcohol outlet density and alcohol consumption at the population-level have found a definitive correlation: the more alcohol establishments there are in a geographic area, the higher the per-capita consumption in that area (Campbell et al., 2009; Scribner et al., 2008; Weitzman et al., 2003; Zhang, 2015). Numerous studies have found a positive correlation between outlet density and violent crime (Gruenewald, 2011; Livingston, 2011; Norström, 2000; Toomey et al., 2012). Reducing alcohol outlet density has been endorsed by the Community Preventive Services Task Force as an effective strategy for reducing



alcohol-related harms (Campbell et al., 2009), primarily because outlet density is a known determinant of high alcohol consumption patterns (Scribner, Cohen, & Fisher, 2000).

This paper adds to the existing literature documenting alcohol outlet densities in the U.S. by analyzing the outlet density around military installations in the U.S., including Air Force, Army, Marine Corps, and Navy installations. Extrapolating from findings around college campuses (Scribner et al., 2008; Scribner et al., 2010; Weitzman et al., 2003), we hypothesize that there will be fewer alcohol outlets per 1,000 people as proximity to a military installation decreases from one to five miles off-installation.

## **Methods**

The alcohol outlet density around military installations in eight states was captured using ArcGIS mapping software (ESRI, 2015) and analyzed to determine the number of alcohol outlets per 1,000 people within varying radii of installations in each state in the sample.

### **States**

States selected for analysis were those that had free and publicly available licensing data for establishments that sell alcohol at the state level and had one or more military installations. These data were found only in the following eight states: Arizona, California, Florida, Nebraska, North Carolina, Texas, Virginia, and Washington.

### **Alcohol License Data**

Addresses of licensed alcohol establishments (e.g., bars, liquor stores) were obtained in 2014 from state licensing agencies (Alcohol Beverage Control Departments or Departments of Licensing/Regulation) for each of the eight states in the sample. Lists obtained from state alcohol beverage control agencies (ABCs) were cleaned for missing data, duplication, and consistency in variable names across states. Alcohol distributors, wholesalers, and wineries were excluded from the study to more accurately capture establishments where military personnel might purchase alcohol. On-sale establishments (e.g., bars, restaurants) and off-sale establishments (e.g., convenience stores, gas stations, grocery stores, liquor stores) were included.

Each record in the dataset included the establishment name, street address, and type of license (on- or off-sale) of the outlet. Addresses for licensed establishments were geocoded using the World Geocode Service on ArcMap 10.3.1 (ESRI, 2015). Geocoding produced spatial matches for 98-100% of licensed outlets for each state for a total of 212,068 alcohol establishments included in the sample. Approximately 3,300 establishments were unable to be geocoded: those that were not geocoded either had misspelling in the street name, the wrong zip code, or incorrect street addresses, and these establishments were excluded from analysis. On- and off-sale establishments were mapped separately and then combined for analyses (Kypri et al., 2008; Weitzman et al., 2003).

### **Population Data**

Population data were obtained at the block-group level from the National Historical Geographic Information System (NHGIS). Within NHGIS, general population came from the 2010 U.S. census and military population data from the 2009-2013 American Community Survey. The NHGIS makes these data available in shapefiles to be manipulated by ArcGIS.

### **Military Installation Data**

U.S. street and military installation data were obtained from TIGER files (Topologically Integrated, Geographically Encoded Reference files), geographic databases available through the U.S. Census Bureau. The files provide street-level maps for the entire U.S. and include address ranges by block. Data on military installations, including nearby towns and military population size, were abstracted from an official Department of Defense website for military installation resources (Department of Defense, 2015).

The population of military installations in the U.S. varies greatly, ranging from less than fifty to over 50,000 active duty military personnel (Department of Defense, 2015). To make the populations of the installations in the sample more comparable, installations within each military service were stratified by population size and all installations in the top quartile of installation population from each of the eight states in our sample were included in the final sample. Table 4.1 shows the number and percent of installations and active duty personnel included in the sample compared to the total number and percent of installations and installation personnel across the U.S.

[Insert Table 4.1 Here]

## Analysis

Analyses were conducted at the state rather than the installation level because of the importance of state policy environments for determining the degree of alcohol availability (Xuan et al., 2015). Previous studies of alcohol outlet density around college campuses considered density at one, two, and three mile radii from the college campus (Scribner et al., 2008; Weitzman et al., 2003). As many military installations are near towns, as opposed to colleges which are often directly in towns, this study of on- and off-sale alcohol outlets modifies the previously cited approaches to include the cumulative density within one, two, three, four and five mile radii from the military installation to determine whether outlets are clustered around the installations, or whether any clustering is more a function of proximity to a major general population center. Although data were captured for each mile radii from 1-5, only results from one, two, and five miles are presented in order to reflect any clustering around the military installation and potential effects of nearby towns. The outlet density at three miles is presented in the Discussion chapter for the sole purpose of making a direct comparison to the alcohol outlet density around college campuses. The number of on-sale, off-sale, and total alcohol establishments were mapped per 1,000 total people within each Block Group, inclusive of military personnel. Density was also determined specifically per 1,000 military personnel within each Block Group. This approach follows Scribner et al.'s model of analyzing the total outlets per 1,000 college students, providing a point of direct comparison to college campuses at the three-mile radius (Scribner et al., 2008).

To determine the one through five mile radii around military installations, points on a map were placed at each entrance to the installation using ArcGIS, based on roads leading onto the post. Mile radii were drawn from each of these entrance points to reflect the primary routes personnel travel to get to and from the installation. The combined general population and specific military population Block Group shapefiles were intersected with the one, two, three, four, and five-mile buffers to capture accurate census data for each radius, including the total population per Block Group per mile. The final step was to intersect the mile-based census files with the full alcohol

shapefile using ArcGIS, which included the addresses and counts of both on- and off-sale establishments. Buffers are radii drawn in ArcGIS that overlay other data; the use of a buffer allows for the joining of alcohol licensing data and population data within a specific distance from the military installations. The final dataset in ArcGIS had, for each buffered mile, the total population, the military population, and the total number of on- and off-sale alcohol establishments (see Figure 1, using an installation in a large western state as an example). Virginia's installations were too close together to appropriately attribute outlets at four and five miles to a particular installation, and therefore these buffers were not included in the study.

[Insert Figure 1 Here]

Any duplicate establishments captured by ArcGIS due to overlapping mile buffers from the proximity of installation entrance points were attributed only to the entrance that they were closest to, and other duplicates were removed. The number of on-sale, off-sale, and total alcohol outlets per 1,000 persons and 1,000 military personnel were calculated for each buffer, and the percent change between mile one and each subsequent mile (2-5) was also calculated to determine the overall difference in alcohol outlet density as proximity to a base decreases. Finally, a separate analysis was conducted to compare the number of alcohol establishments per 1,000 military personnel to similar data in the college context, and the alcohol outlet density at three miles was summed across all eight states in the sample for this analysis.

## Results

The Air Force installations selected for this study comprised 10% of total Air Force bases in the U.S., which includes 23% of the active duty Air Force population. Similarly, the sample includes 12% of Army installations, comprising 63% of the active duty Army population; 20% of Marine Corps installations with 61% of the active duty Marine Corps population; and 16% of Naval installations with 58% of active-duty sailors. Although the sample of installations included in this study only constitutes a minority of total installations in the country, the approach captured over half of the personnel in each service, with the exception of the Air Force, as many large Air Force Bases

are located in states not included in our sample. Table 4.2 provides the list of all installations included in this sample, along with the military service represented, location, and total population of active-duty service members at each installation.

[Insert Table 4.2 Here]

### **Population-Level Density**

Table 4.3 provides the ratio of alcohol outlets per 1,000 individuals for on-sale, off-sale, and total alcohol establishments within one, two, and five miles of a military installation.

[Insert Table 4.3 Here]

The total number of alcohol outlets per 1,000 people within five miles of a military installation in each of the eight states ranged from 0.10 to 2.64. The range of off-sale establishments per 1,000 people was 0.20 to 1.08; the range of on-sale outlets was 0.10 to 2.02 per 1,000 individuals. The two highest densities across all the radii analyzed (combined on- and off-sale) were found within one mile of installations in California and Florida (2.64 and 2.42 per 1,000 people, respectively).

#### ***One Mile from Installation***

In four of the eight states, off-sale alcohol outlet density decreased as the radius moved from one mile to two miles from the installation. Three states had decreases in on-sale density from one mile to two miles from the installation. The greatest decrease in density was 78% in Nebraska, with a decrease from 0.92 off-sale outlets per 1,000 people at one mile to 0.20 outlets per 1,000 people at two miles. The largest increase in alcohol outlet density from mile one to two was a 100% increase, also in Nebraska, from 0.10 on-sale outlets per 1,000 people at mile to 0.20 on-sale outlets per 1,000 people at two miles, and Florida had an 83% increase in on-sale outlets, with density increasing from 0.41 per 1,000 people at mile one to 0.76 on-sale outlets per 1,000 people at mile two.

#### ***Five Miles from Installation***

Analysis of alcohol outlet density between mile one and mile five of military installations showed that, within at least one of the outlet categories (on-sale, off-sale, and total outlets), all but two states had more outlets per 1,000 individuals within one mile of the installation than at a five mile radius. The largest decrease in total outlet density per 1,000 individuals from one mile to five

miles was in California at 33%, followed by Washington at 18%. Conversely, four states (Arizona, Florida, North Carolina, and Texas) saw increases in total outlet density from one mile to five miles where alcohol outlet density was higher further from the installation than closer, ranging from 4-75%. Averaging the percent change in density across all eight states, there was an 11% decrease in off-sale alcohol outlet density and a 97% increase in on-sale alcohol outlet density from miles one to five. The increase in on-sale outlets is largely driven by Nebraska, where there were few outlets within a mile of military installations. Though many installations are within five miles of a large metropolitan area, such as Davis-Monthan Air Force Base near Tucson, AZ, Camp Pendleton near Oceanside, CA, and Lackland Air Force Base near San Antonio, TX, total alcohol outlet density did not increase in half of the states analyzed as the proximity to the town center increased (data not shown). This suggests a clustering of alcohol establishments outside of many military installations regardless of nearby towns or city centers.

## Discussion

The data presented here suggest that alcohol outlet density per 1,000 individuals decreases as proximity to military installations decreases half of the eight states analyzed, and there was an average 11% decrease overall in off-sale alcohol outlet density and 97% increase in the on-sale alcohol outlet density across all states analyzed. When combining the on- and off-sale outlet density, there was only a 7% increase in density as you move further from the installation. Though this analysis cannot speak to the association between the prevalence of alcohol establishments with consumption or alcohol-related consequences among military personnel, we might extrapolate from the college literature that has explored this relationship. For example, Scribner et al. (2008) found that when the density of on-sale outlets within three miles of college campuses increased by one standard deviation, the number of drinks students reported drinking when partying increased by 0.57. Wechsler et al. found that individuals who lived near a college campus were more likely to have alcohol outlets near them and to report higher rates of binge drinking and secondhand effects of heavy alcohol use, including noise and vandalism (Wechsler, Lee, Hall, Wagenaar, & Lee, 2002).

### **Similarities Between Military And College Alcohol Outlet Densities**

There is a strong relationship between alcohol outlet density and alcohol consumption in areas surrounding college campuses (Kypri et al., 2008), institutions that share demographic and cultural features with the military, including a “work hard, play hard” mentality (A. Sparks, Smith, et al., In Progress). Studies have found that alcohol outlet density is associated with both heavy and frequent drinking as well as alcohol-related problems among college students (Weitzman et al., 2003), including violence (Scribner et al., 2010). Scribner et al. (2008) studied the relationship between alcohol outlet density and drinking outcomes among college students. They analyzed the number of alcohol outlets per 1,000 college students within three miles of college campuses and found that the density of alcohol outlets on- and off-campus accounted for much of the differences in risk related to college drinking outcomes, including the number of alcoholic beverages consumed while partying. In addition to the data presented above on miles 1, 2, and 5, this study analyzed the alcohol outlet density per 1,000 military personnel three miles from the installation to determine whether the density around military installations is similar to the density reported in the college literature. This study found that the outlet density of off-sale establishments around military installations is higher for military personnel than the outlet density around college campuses (Scribner et al., 2008). Scribner and colleagues found that the mean density per 1,000 college students was 24.5 for on-sale and 9.7 for off-sale alcohol outlets within three miles of college campuses nationwide; this translates to approximately one on-sale outlet for every 40 college students and one off-sale establishment for every 103 college students for universities in their sample. Comparing these data to military installations, the military has higher off-sale alcohol outlet density within three miles of the installation (11.1 off-sale outlets per 1,000 military personnel compared to 9.7 off-sale outlets per 1,000 college students), but approximately half the on-sale alcohol outlet density (13.6 on-sale outlets per 1,000 military personnel compared to 24.5 on-sale outlets per 1,000 college students). Scribner et al.’s study is nearly ten years old; however, it is unlikely that time trends would account for the differences in the physical surroundings of college campuses and military installations.

Although this paper does not analyze consumption and harm data for the military due to a lack of disaggregated data, it builds on the existing literature showing the relationship between alcohol outlet density and consumption in other settings. Given these examples, there a number of policy levers that can lead to a reduction in alcohol outlet density, including land use and zoning policies (Jernigan, Sparks, Yang, & Schwartz, 2013). The proximity of outlets near military installations and similarities between the number of alcohol outlets near military installations and college campuses, particularly off-sale establishments, suggest that interventions that have proven successful in college and broader community settings may also reduce excessive and underage drinking around military installations. Both colleges and military installations are immersive institutional environments with high concentrations of young adults who are in the process of forming their identities, including their drinking identities and associated behaviors (A. Sparks, Smith, et al., In Progress).

At the population level, lower alcohol outlet density in the community is associated with lower rates of alcohol consumption and related consequences (Campbell et al., 2009; Scribner et al., 2000). There are a number of ways in which outlet density can be reduced in a community, including conditional use permits, deemed approved ordinances, or other zoning policies, as well as enhanced enforcement of existing licensing restrictions. Requiring conditional use permits for alcohol outlets allows communities to determine whether the proposed application for alcohol sales will have a negative impact on the community, which can directly affect outlet density. Additionally, the use of public nuisance, or deemed approved, ordinances allows local governments to reduce alcohol outlet density, particularly when drinking in or around those outlets causes noise, nuisance or other problems to the surrounding communities. These ordinances require establishments to meet certain performance standards for public nuisances, safety, and health concerns (M. Sparks et al., 2011). Ordinances that allow the review of liquor renewal requests for any establishment that has violated local laws or codes can be passed by local governments. These ordinances can complement the regulation of outlets through the liquor license renewal process without necessarily being preempted



by state authority to control liquor licensing – analysis of state laws in 2012 found that local governments in 42 states were not preempted in this arena (Mosher & Treffers, 2013). Local governments have worked to successfully implement evidence-based strategies to reduce alcohol consumption, including reducing alcohol outlet density, in civilian communities (M. Sparks et al., 2011), and the military has worked with local communities on other environmental strategies, including enhanced enforcement of driving while under the influences (Spera et al., 2012), (Ames & Spera, 2011; Spera et al., 2012; Spera, Thomas, Barlas, Szoc, & Cambridge, 2011) suggesting this is an approach that could be further tested around military installations across the country.

One limitation of this approach may be that by reducing the number of places to purchase alcohol in the nearby community, military personnel may purchase increased quantities of alcohol at military commissaries, which often sell alcohol at prices lower than those in nearby outlets (Vergakis, 2013). This possible unintended consequence underscores the need for a comprehensive approach to alcohol availability within and near military installations, incorporating measures that reduce availability on-base as well as in the surrounding community.

## **Limitations**

This paper has important limitations to be considered. First, we are comparing 2010 population data to 2014 alcohol licensing data; though these were the most recent publically available data sources for each at the time of writing, it is important to note the discrepancy in years. The alcohol outlet data were also more than one year old at the time of the analysis, and may not reflect current establishments in each of the eight states. This paper only analyzes alcohol establishments in the community off-installation, and does not capture access to alcohol on the installation, such as commissaries selling alcohol for off-sale consumption or officers' clubs providing it for on-sale consumption; also, the establishments that could not be geocoded were excluded from this analysis, missing a segment of the alcohol outlets near military installations. The inclusion of these establishments would create a more comprehensive view of the alcohol environment of military personnel. Additionally, this study does not explore other potential factors that may affect alcohol

outlet density, including analyzing the data by military service, population on each service, local and state alcohol policies that may influence the alcohol outlet density. Given that the data presented in this paper do not show a clear trend in density as proximity to the base decreases, analyzing these additional factors may help explain a stronger relationship.

## **Future Research**

Excessive and risky alcohol use is a significant problem in the U.S. military. Reducing it will require looking beyond interventions that occur directly on the military installations, such as media and social norms campaigns, and beginning to focus on environmental interventions that have been shown to be effective in reducing excessive alcohol use and related harms. Additionally, collecting installation-level data on alcohol use by military personnel and alcohol-related consequences will allow for an analysis of how density is correlated with risk, as has been done for college populations. Publicly available information on alcohol consumption or related harms at the level of the military installation is not available, limiting our ability to evaluate the relationship between outlet density, drinking behaviors, and related problems in the military context. It is critical to collect these data in order to evaluate the relationship between outlet density, alcohol consumption, and related harms around military installations.

## **Conclusion**

This study contributes to a gap in the literature regarding alcohol outlet density and a vulnerable population: members of the U.S. military. It is the first study to look at the density of alcohol establishments surrounding military installations by mapping alcohol outlet density around a census of large installations in eight states across the country. A strong correlation has previously been found between the incidences of alcohol-related harms within college populations and high alcohol outlet density around college campuses. Based on the institutional similarities of college and military communities, community-based interventions to reduce alcohol outlet density that have been successful in the college context may be translatable to the military. This study lays the groundwork for continued investigation with a comprehensive analysis of clustering around select installations

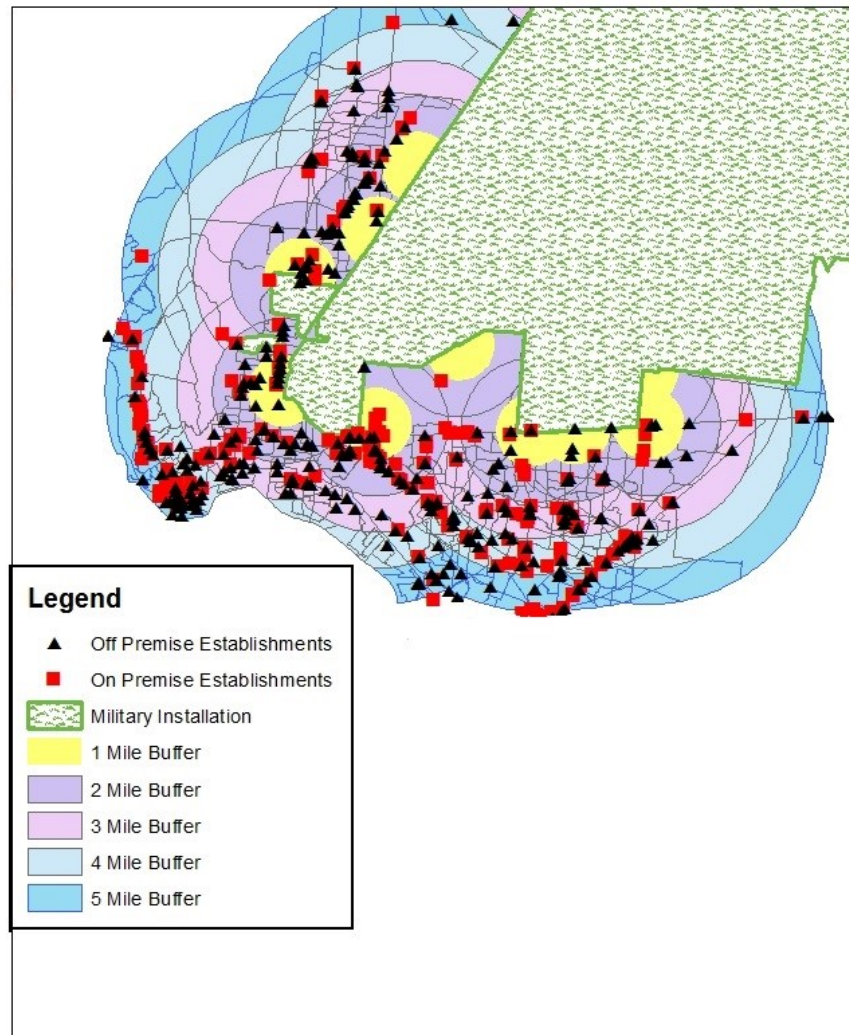
and offers important baseline data for communities to use as they work to implement effective interventions to reduce high-risk alcohol consumption among military personnel.

**Table 4.1: Percent of Installations and Personnel Included in this Study, by Military Service**

	<b>Base</b>	<b>Percent of Total Bases</b>	<b>Military Personnel*</b>	<b>Percent of Total Base Personnel Included in the Sample</b>
<b>Air Force</b>				
<b>Sample</b>	6	10%	63,957	23%
<b>Total</b>	59		277,612	
<b>Army</b>				
<b>Sample</b>	6	12%	176,779	63%
<b>Total</b>	50		279,301	
<b>Marine Corps</b>				
<b>Sample</b>	3	20%	91,822	61%
<b>Total</b>	15		151,008	
<b>Navy</b>				
<b>Sample</b>	8	16%	202,590	58%
<b>Total</b>	50		351,420	
*Base personnel numbers were obtained in 2015				

Figure 4.1: Example of Alcohol Outlet Density around a U.S. Military Installation

### Example of Outlet Density around US Military Installation



**Table 4.2: Specific Military Installations Selected for GIS Analysis**

<b>State</b>	<b>Service</b>	<b>Installation</b>	<b>Military Personnel*</b>
Arizona	Air Force	Davis-Monthan AFB	6,526
Arizona	Army	Fort Huachuca	5,600
Arizona	Air Force	Luke AFB	4,130
California	Marine Corps	Camp Pendleton	33,700
California	Navy	Coronado Naval Amphibious Base	15,000
California	Army	Fort Irwin	9,958
California	Navy	North Island Naval Air Station	35,000
California	Navy	San Diego Naval Station	20,000
California	Air Force	Travis AFB	10,296
California	Marine Corps	Twenty-Nine Palms Mc Air-Ground Combat Center	12,500
Florida	Air Force	MacDill AFB	14,150
Florida	Navy	Mayport Naval Station	15,150
Florida	Navy	Pensacola Naval Air Station	14,544
Nebraska	Air Force	Offutt AFB	8,855
North Carolina	Marine Corps	Camp Lejeune	45,622
North Carolina	Army	Fort Bragg	52,280
Texas	Army	Fort Bliss	27,991
Texas	Army	Fort Hood	41,360
Texas	Air Force	Sheppard AFB	20,000
Virginia	Navy	Little Creek Naval Amphibious Base	10,000
Virginia	Navy	Norfolk Naval Base	82,896
Virginia	Navy	Oceana Naval Air Station	10,000
Washington	Army	Fort Lewis-McChord	39,590
*Base personnel numbers were obtained in 2015			

**Table 4.3: Alcohol Outlet Density per 1,000 people around Military Installations, 2015**

<b>Mile Radii</b>	<b>Off/Pop</b>	<b>On/Pop</b>	<b>Total/Pop</b>	<b>% Change Off-Sale</b>	<b>% Change On-Sale</b>	<b>% Change Total-Outlets</b>
<b>Arizona</b>						
0-1	0.65	0.74	1.39	0%	0%	0%
0-2	0.68	0.78	1.46	5%	5%	5%
0-5	0.57	0.91	1.48	-12%	23%	7%
<b>California</b>						
0-1	0.62	2.02	2.64	0%	0%	0%
0-2	0.67	1.64	2.31	8%	-19%	-12%
0-5	0.59	1.17	1.77	-5%	-42%	-33%
<b>Florida</b>						
0-1	0.97	0.41	1.38	0%	0%	0%
0-2	0.99	0.76	1.74	2%	83%	26%
0-5	1.04	1.38	2.42	8%	233%	75%
<b>Nebraska</b>						
0-1	0.92	0.10	0.92	0%	0%	0%
0-2	0.20	0.20	0.40	-78%	100%	-56%
0-5	0.34	0.55	0.89	-63%	447%	-3%
<b>North Carolina</b>						
0-1	0.33	0.24	0.57	0%	0%	0%
0-2	0.33	0.28	0.61	-1%	20%	8%
0-5	0.31	0.28	0.59	-7%	18%	4%
<b>Texas</b>						
0-1	0.68	0.61	1.29	0%	0%	0%
0-2	0.72	0.50	1.22	7%	-19%	-5%
0-5	0.85	0.67	1.53	26%	10%	18%
<b>Virginia</b>						
0-1	0.78	0.96	1.75	0%	0%	0%
0-2	0.54	0.62	1.16	-31%	-36%	-34%
<b>Washington</b>						
0-1	1.08	0.89	1.97	0%	0%	0%
0-2	0.98	1.04	2.03	-9%	18%	3%
0-5	0.79	0.83	1.62	-27%	-6%	-18%
<b>Average % Change at 5 Miles*</b>				<b>-11%</b>	<b>97%</b>	<b>7%</b>
-All data are looking at cumulative establishments within one, two, and five miles of the military installation. *Percent change was calculated by subtracting the alcohol outlet density per 1,000 individuals at the further mile radius (2 and 5) from the density at the one mile radius and dividing by the density at one mile.						

## Chapter 5 : A Description of the Alcohol Environment Surrounding 12 U.S. Military Installations

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**Keywords:** Military, price, advertising, alcohol, substance use, health,

### Abstract

**Background:** Military personnel in the United States have high rates of binge and heavy drinking, both of which are associated with higher rates of driving under the influence, violence, and poor work performance. This paper provides a descriptive analysis of environmental risk factors in the alcohol environments surrounding twelve randomly selected United States military installations across the four major military services: Army, Navy, Marine Corps, and Air Force. **Methods:** Ten establishments, five on-sale (restaurants and bars) and five off-sale (convenience stores, grocery stores, and liquor stores) were randomly selected around each military installation. Data collected included the price of beer and liquor; the number of alcohol advertisements within and immediately outside of each establishment, including the number of military-specific advertisements; the alcohol promotions and discounting that occur at each establishment; the placement of alcoholic products in relation to non-alcoholic beverages such as soda or iced tea; and the types of alcohol products available at each establishment around each installation. High, medium, and low risk categories were determined through the creation of a risk score focused on availability of inexpensive alcohol products and on the kinds of alcohol promotions and products found on site. **Results:** The majority of on-sale establishments were in the high-risk category, and a majority of the off-sale establishments were in the medium-risk category. **Discussion:** There are a number of evidence-based intervention implications resulting from these findings that could be applied from broader community settings to the military context. This is the first study to describe how and where alcohol is marketed, priced, and sold around military installations.



## Introduction

Military personnel report consuming alcohol at high rates that can then negatively impact their health, safety, families, and communities (Fernandez et al., 2006; Gradus, Street, Kelly, & Stafford, 2008; Jones & Fear, 2011; Stahre et al., 2009). According to a standardized comparison presented in the 2012 Health Related Behavior Survey (HRBS), the only Department of Defense (DoD)-funded survey of health in the military population, the prevalence of younger military personnel reporting heavy drinking rates was nearly two times as high as their civilian counterparts (Barlas et al., 2013). In addition to heavy drinking, many military personnel are more likely to engage in binge drinking (defined as five or more drinks for men or four or more drinks for women on the same drinking occasion in the past 30 days). When stratifying the military by age, 21% of underage military personnel reported binge drinking in the past 30 days; the binge-drinking rate increases to 45.4% among those 21-25 years old. These rates vary by gender and branch of service, with more male personnel binge drinking than female personnel, and Marines reporting the highest rates of binge drinking across all services. Among Marines, nearly half of all personnel reported binge drinking in the past 30 days, compared to, for example, 23% among Air Force personnel (Barlas et al., 2013).

The high levels of alcohol consumption are associated with a number of alcohol-related consequences. For example, a study of domestic violence in the Air Force found that 57% of sexual assaults and 20% of domestic violence incidents involved alcohol use (Armed Forces Health Surveillance Center, 2011); another study found that 18.4% of active duty military personnel who drank reported one or more alcohol-related problem directly related to their job performance (Stahre et al., 2009). In 2006, the Air Force reported that binge drinking was a factor in 33% of suicides and 44% of fatal motor vehicle crashes (U.S. Air Force, 2006).

In a 2012 report, the Institute of Medicine (IOM) issued 12 recommendations to reduce rates of substance use and related negative health outcomes in the U.S. military. The first recommendation suggested that the military should implement a comprehensive, multi-level set of

evidence-based prevention programs and policies, including those targeting at-risk individuals, those who have been identified as problem drinkers, and the broader public (Institute of Medicine, 2012). The IOM specifically recognized the need for consistent enforcement of laws on underage drinking, reducing alcohol outlet density in communities around military installations, limiting days and hours of alcohol sales, and improving Screening, Brief Intervention, and Referral to Treatment (SBIRT) programs. Implementation of these strategies would address the entire military population, not just high-risk drinkers, and thus holds the potential for substantial impact on the health, well-being, and combat readiness of military personnel.

The IOM's recommendations regarding alcohol outlet density and days and hours of alcohol sales draw attention to alcohol outlets near military installations. Research has found the density of such outlets at a level similar to college campuses, and the off-sale outlet density increases as proximity to military installations increases (A. Sparks, Cohen, et al., In Progress). Yet there is little research available on the specific factors about these establishments that may put military personnel at risk. Alcohol marketers are arguably the most active shapers of alcohol environments nationwide (Cowan & Mosher, 1985; M. C. Jackson et al., 2000). Thus, the alcohol problems prevention field has found it useful to borrow from marketing a taxonomy for analyzing and enumerating both risk and preventive opportunities in alcohol environments, based on the "4 P's" of marketing: price, promotion, place and product (Cowan & Mosher, 1985; M. C. Jackson et al., 2000). Industry marketing executives have historically described these four elements as synergistic; August Busch III famously remarked that they blend in a "single orchestrated thrust" (Clairmonte & Cavanagh, 1985). Similarly, this paper will explore the synergies these elements create in terms of risk in alcohol outlets, attempting to scale the level of risk based on scores that reflect the elements (with the exception of place, which is the element being described) as they present in the alcohol environments near military installations in which people make their alcohol purchasing and consumption decisions.

## Methods

An environmental scan of alcohol establishments was designed to evaluate the level of risk created by alcohol advertising, pricing, and product availability in or around these establishments. The scanning process involved data collection immediately adjacent to and within alcohol establishments. This use of environmental scans to identify high-risk practices has been validated through work on alcohol, tobacco, and other drug issues around college campuses and in communities across the U.S. (Feighery et al., 2001; Henriksen et al., 2008; Wagoner et al., 2014).

### Military installations

Environmental scans, defined as “a form of community assessment that investigates the physical elements within a community contributing to alcohol or other drug use” (Olson, n.d. ), were conducted in alcohol establishments around three randomly selected installations for each of the four DoD service branches of the military (Air Force, Army, Marine Corps, Navy) for a total of twelve military installations. Installations for each service were stratified by population size at each installation and randomly selected. Installations with populations in the top tertile within each service were then included in the sample. Table 5.1 presents the sample of installations included in the study, along with the percent of the total military population present on each installation for an analysis of representativeness.

[Insert Table 5.1 here]

### Alcohol Establishments

Before conducting site visits to each of the selected military installations to conduct environmental scans, the lead author obtained lists of on and off-sale alcohol licensees in the town adjacent to each installation in eight states with publically available data through the state Alcohol Beverage Control (ABC) or other regulatory/licensing agency. Lists of on- and off-sale alcohol establishments were geocoded using the geographical information system (GIS) software ArcMap 10.3 (ESRI, 2015), and circular one, two, and five mile buffers, drawn from each entry point to the installations, were developed using ArcGIS spatial analysis. Five on-sale (restaurants and bars) and five off-sale (convenience, grocery, and liquor stores) alcohol establishments were then randomly

selected from within a two-mile buffer of each military installation in order to capture the establishments in closest proximity to the military installation while maintaining greater geographic variation than would be possible if only scanning establishments within one mile of the installation. If there were fewer than ten establishments within two miles of an installation, the remaining establishments were randomly selected from within the five-mile buffer. Similar sampling methodology has been used and validated in a number of existing studies conducting environmental scans of both alcohol and tobacco outlets (Henriksen et al., 2008; Scribner et al., 2008; Wagoner et al., 2014; Wakefield et al., 2002).

### **Measures**

A new environmental scanning tool specific to the military community was created by combining and modifying existing alcohol and other drug scanning tools, including the Community Anti-Drug Coalitions of America's Environmental Strategies scan (CADCA, 2010); the California Alcohol Beverage Control's Responsible Beverage Service guide (CA ABC, n.d.), the Idaho Prosecuting Attorney's environmental scanning tool (Olson, n.d. ), and the Lee Law Toolkit (California Friday Night Live Partnership, 2013). Two separate tools were created: one for off-sale establishments and one for on-sale establishments. A majority of the questions were the same across the two scans, with some modifications based on the differences between the types of establishments. For example, the on-sale scan included a question on the presence of drinking games, which would not be found in off-sale establishments, and asked about the price of one drink (one pint of beer, one shot of vodka) rather than a six-pack of beer or a bottle of vodka. The off-sale scan asked about the location of alcohol, such as whether it is sold in coolers directly adjacent to non-alcoholic beverages, and included different products that are not typically found in on-sale establishments, such as pre-mixed pouches and airline-sized bottles of alcohol. Questions included, but were not limited to: type of outlet (grocery store, convenience store, liquor store, bar, or restaurant); price of product (for beer, liquor, and wine); promotions (events, price promotions); presence of interior and exterior advertising (coded for extent as well as for content targeted to

military personnel through images of soldiers, military equipment such as tanks or weapons, or slogans directed towards the military such as “Budweiser supports our troops” and “Welcome back to the [Miller] High Life”), and alcohol products available. The specific alcohol beverages and brands scanned were based on the most popular brands among underage drinkers in each category of beer, vodka, malt liquor and fortified wine (Siegel et al., 2013). The scanning instrument covered three of the 4 P’s of marketing, with “place” having been analyzed in a prior paper (A. Sparks, Cohen, et al., In Progress). The variables included in the scan were drawn from research studies linking elements of the 4 P’s to high-risk alcohol consumption and related consequences, particularly in the college environment, which has many similarities to military installations (A. Sparks, Smith, et al., In Progress). The full scan instruments are available in Appendix C and D.

### **Scanning**

The lead author conducted all scans using Google Forms on a cellphone to both conduct the scan and simultaneously compile the data while at each establishment. Scans were done during the day whenever possible for safety reasons: data were first collected outside of the establishment, counting the number of outdoor alcohol advertisements and looking for “We ID” or other age verification notices; and then the scanners entered the establishment. In off-sale establishments, the scanner would walk through the store counting the alcohol advertisements, noting where and what types of alcohol products were sold, capturing the price of beer, wine, and spirits. Discounts on alcohol were also noted, including the brand and level of discounting. Each off-sale scan took approximately ten minutes. Once the scanner entered an on-sale establishment, she sat at a table or at the bar and again counted the alcohol advertisements inside the establishment and noting alcohol promotions or specials. This often required entering restrooms where advertisements and promotion flyers were common. The types and prices of alcohol were captured by either talking to the waiter or bartender or analyzing the menu. On-sale scans averaged fifteen minutes. Data were entered into a Google Spreadsheet to be cleaned and analyzed.

## Analysis

Some variables were excluded from the analysis that either were repetitive with ones already included in this analysis, such as additional questions on price discounting, or fit into the P of “place”, which was not analyzed in this paper. In the absence of a validated tool to assess the risk of alcohol establishments, this study analyzed data using two, three, and four risk categories. Creating a two-category risk index limited the specificity in the data collected, and the four-category risk scale presented little variation in the findings. As a result, this study presents a three-category risk index (low, medium, high) in order to analyze the risk of each establishment. To facilitate comparison across establishments as well as across and within military services, a three-category risk index was created by assigning a score of 0, 1, or 2 for variables recognized as having the potential for creating risk for excessive alcohol use in the literature. For dichotomous variables, a score of zero indicated the variable was not present, and two indicated that it was. For variables for which there was a gradation of risk, including many of the advertising and promotion variables, a zero denoted low risk, and a value greater than zero and less than the mean was medium risk (scoring 1 point) while anything greater than the mean was high risk (scoring 2 points). Price variables were an exception to this rule; as lower price is correlated with higher risk (Wagenaar et al., 2009), these variables were reverse coded. Price variables within one standard deviation of the mean were given a “1”; variables more than one standard deviation above the mean were given a “0” and more than one standard deviation below the mean were given a “2”. Categories for high, medium, and low-risk establishments were created by dividing the highest points scored by the establishments into equal tertiles for both the on- and off-sale scales. Though the highest points scored differed for the on-sale and off-sale risk scores, the categories were determined in the same way. See Table 5.2 for the coding scheme for each variable.

[Insert Table 5.2]

## Results

### Establishment Characteristics

A total of 112 alcohol establishments were scanned: 55 on-sale and 57 off-sale establishments; data for eight establishments were lost due to poor cell phone service not syncing to the online spreadsheet. The on-sale establishments included 16 bars and 39 restaurants, many of which included separate bar areas. The off-sale establishments included 33 convenience stores, 15 grocery stores, and 9 liquor stores. A number of chain establishments were included in the sample for both on- and off-sale establishments, such as Applebee's, Chili's, 7-11, CVS, Safeway, and Chevron, while others were independent establishments such as local restaurants and grocery stores. Approximately 23% of the establishments scanned were around Air Force Bases, 25% of establishments were around Army installations, 25% were around Marine Corps installations, and 27% were around Navy Bases. The majority of establishments (76%) were not located in "control states", or states that control the sale of distilled spirits, beer or wine at the wholesale or retail level; however, 36% of the establishments around Navy Bases were located in control states and 32% of the establishments around Marine Corps installations were in control states.

[Insert Table 5.3]

### Summary Risk Scores

Table 5.4 describes the risk level of both on- and off-sale establishments on the axes of promotion, product, and price. Nearly all on-sale establishments were medium or high risk (90%), while only 10% were low-risk. Of the 39 restaurants scanned, 10% were low risk, 44% were medium risk, and 46% were high risk. The categories were similar for bars, with 19% in the low-risk category, 38% in the medium-risk category, and 44% were in the high-risk category. The off-sale establishments were mostly in the medium-risk category across convenience stores, grocery stores, and liquor stores. No grocery stores were in the high-risk category, and only 6% of convenience stores were high-risk. Though there were fewer liquor stores in the sample, 33% were high-risk compared to only 10% in the low-risk category. Overall, 80% of the total alcohol establishments scanned were in the medium or high-risk category, suggesting that most establishments had high

numbers of alcohol advertisements, including outdoor advertisements covering the window, indoor alcohol advertising, and/or advertisements targeting the military specifically, a variety of high-risk alcohol products, and low prices and price discounting on alcohol.

[Insert Table 5.4]

### **Establishment Risk by Military Service**

Alcohol establishment risk scores were also analyzed by branch of military service. Among on-sale establishments, the Army and Navy had more establishments in the high-risk category than the medium or low-risk category, while the Air Force and Marines had nearly equal establishments in the high and medium risk categories. Nearly 67% of the bars around Army bases were in the high-risk category; this represents the highest percentage of high-risk establishments across the services. When looking at off-sale outlets, the trend is not as clear. The majority of establishments across all services were in the medium-risk category, while only a small minority were high-risk. There were no high-risk off-sale outlets around Army or Marine Corps installations. The Navy had the greatest number of high-risk establishments at three (20%) followed by the Air Force with two (13%).

[Insert Table 5.5]

## **Discussion**

In this study, the large majority of alcohol establishments near the sampled military installations were classified as either medium- or high-risk when analyzing promotions, products, and price. The ubiquity of these alcohol establishments near military installations creates a high-risk environment that may affect alcohol consumption and related consequences among military personnel and their families. The presence of this level of risk also points to the need for evidence-based interventions that address the risk factors described above. The prevention paradox, posited by Rose (2001), notes the importance of focusing on the larger number of medium-risk establishments in order to address the broadest segment of the population that engages in different levels of risk behavior, particularly given that no data currently exist on which establishments are most frequented by military personnel. There are a number of interventions that can be implemented at the



establishment and community levels to address the four P's at varying levels of risk; these are described briefly below.

### **Banning Individual Establishments**

“Banning” alcohol outlets – that is, placing them off-limits to military personnel – can address the highest-risk establishments, including those that have deep price discounts specifically for the military or that sell to underage individuals. This is an established practice in the U.S. military under military regulations such as Army Regulation 190-24, which establishes the Armed Forces Disciplinary Control Boards (AFDCP) which makes recommendations to base commanders on matters “concerning eliminating conditions, which adversely affect the health, safety, welfare, morale, and discipline of the Armed Forces.” Service members entering off-limits establishments are subject to disciplinary action under the Uniform Code of Military Justice (United States Army, 2006). One Army base in Colorado reported updating its list of banned establishments several times each year, taking gang presence, over-service of alcohol, and prevalence of violence in or near the establishment into consideration. If service members are found patronizing a banned establishment, they are subject to disciplinary action (Watts, 2012). In January 2015, the President of the AFDCP for Joint Base Lewis-McChord sent letters to 86 establishments that sold marijuana or substances similar to marijuana, which are legal in the state of Washington, to service members, informing the owners that their establishment would henceforth be off-limits for personnel. If the establishment provided evidence to the AFDCP that they agreed to stop selling marijuana within 30 days of receiving the notice, they could be removed from the list (La Corte, 2015). This practice not only reduces the likelihood of an individual engaging in high-risk behavior at these establishments, but could act as an incentive for other high-risk establishments to reduce the characteristics associated with excessive alcohol consumption in order to stay accessible to military personnel. However, banning is likely to be used only for the highest risk establishments (Watts, 2012), and thus will only address a small subset of establishments in the community. Banning may also not be able to keep up with new establishments opening near the installation.

### **Community-Level Interventions**

The findings presented in this paper suggest a number of applicable interventions to reduce the level of risk posed by alcohol establishments adjacent to military installations. These interventions include limiting outdoor alcohol advertising, banning happy hours, and reducing the number of alcohol products available for purchase. All of these currently exist in one or more states (Mosher & Cohen, 2012), and could be implemented at the local or state level to affect all alcohol establishments within these jurisdictions (National Institute on Alcohol Abuse and Alcoholism, ND; Ross, Sims, & Jernigan, 2016). These interventions would need to be accompanied by a strong enforcement component to ensure the laws are being followed. By reducing any one of the three primary risk factors (product, promotion, price), the overall risk score would also decrease, likely improving the health and safety of the military personnel and community.

Taken alone, the presence of any of these risk factors, whether it be drink specials, alcohol advertisements, low prices, or new and high alcohol volume products, has shown direct correlation to alcohol use and consequences (Anderson et al., 2009; Erenberg & Hacker, 1997b; Kuo et al., 2003). This study highlights a gap in the literature in identifying what factors constitute a high-risk establishment as there are no current studies that focus on evaluating the alcohol risk environment at the establishment level. There is literature on each of the specific risk factors discussed in this paper (price, promotion, product, and place) (Babor, Mendelson, Greenberg, & Kuehnle, 1978; Chaloupka et al., 2002; Howard, Flora, Schleicher, & Gonzalez, 2004; R. S. Moore et al., 2007; Wagenaar et al., 2009), but additional research is necessary to determine how these variables work synergistically to create an overall risk environment as well as to determine what other variables may contribute to the alcohol environment. This paper seeks to begin filling that gap by looking comprehensively at the overall risk an establishment can create in a community.

### **Future Research**

Future research around problematic alcohol use by military personnel should consider the relationship between alcohol consumption and consequences with establishment risk factors in order

to truly understand what risk these establishments pose to military personnel. The establishment of this relationship would allow for the analysis of the effects of risky establishments on alcohol-related harms, clarifying and confirming the need for the control of place (density), price, promotion, and product in communities around military installations. This type of study is also needed to analyze how establishment risk factors affect consumption in a temporal framework. For example, it can be posited that price and product create a more acute risk as discounted drinks and products of high alcohol strength can lead to greater levels of consumption in a shorter time period. The place and promotion of alcohol can create longer-term community norms that make alcohol consumption seem like an expected and accepted behavior; this is of particular concern when alcohol companies and establishments directly advertise to military personnel. This study would allow for an assessment of how risk factors manifest in risk behaviors at the establishment level.

## **Limitations**

These data could not be compared to outcome data at each establishment due to the lack of disaggregated, installation-level data on alcohol consumption and related harms. A critical limitation to consider when reading the results of this study is that there is not a validated risk index available to model these analyses after. The use of a validated risk index would evaluate the alcohol risk environment around military installations in a systematic fashion, and could make these data directly comparable to risk scores in other communities or around other institutions. Additionally, these data are not directly comparable to data from another population, such as college students, due to the lack of available data, which would allow us to have a better understanding of how the military's alcohol environment is or is not different from similar institutions. There were also technological barriers: the data collection tool required cellular service, and not all installations were located in areas with a strong enough signal, which resulted in lost data. The analysis also did not take into account differences in the size of the establishment. For example, ten advertisements in a large grocery store may have much less impact on exposure to alcohol advertising than ten advertisements in a small convenience store. Establishment data were collected at one time point, which may have skewed the

results. For example, if the establishment was visited during a happy hour, the price of drinks may have been artificially low, and though the time of day was noted in the scan, whether it was during happy hour was not. If an establishment was visited earlier in the day rather than later, certain specials may not have been advertised. Future studies would involve a larger data collection team that can visit establishments on the same day of the week and at the same time for consistency across sites. Scans were not conducted on alcohol establishments located on military installations; these establishments may be more frequented than establishments outside of the installation and have different risk factors to evaluate. Additionally, the results may have been different if the establishments were selected from mile buffers further from the installation. Finally, visits to these establishments painted a somewhat different picture than the data show, suggesting that the scanning tool did not accurately capture the magnitude of the risk in each establishment. Because the size and location of advertising and promotions were not measured in the interior of the establishments, the data do not reflect the pervasiveness of ads, price promotions and targeting of military personnel. Certain on-sale establishments had active bar scenes with many young men drinking large beers and cocktails and military service flags hanging on the walls. The difference between the quantitative results and the qualitative findings suggest that it is difficult to accurately capture these realities in a quantitative way that exposes the full risk of each establishment.

## **Conclusion**

This is the first study to look at the alcohol environment surrounding military installations, recognizing the potential influence of that environment on alcohol consumption and related harms within this population. This study includes variation across military service installations in eight U.S. states, allowing for greater generalizability of these data to the communities around military installations that were not scanned. Additionally, the scanning tool was modified from existing tools, providing the option to do comparisons between military and similar populations in the future. Finally, all information was collected by one data collector, ensuring the standardization of data collection across installations.

Military personnel have high rates of excessive alcohol consumption and related harms, and new approaches to reducing these problems should be considered. The data presented here can provide guidance as to points of intervention for military leaders, researchers, practitioners and community groups interested in addressing excessive and high-risk alcohol use and related consequences in communities in close proximity to military installations. Given the potential negative impact of alcohol use on military preparedness, routine collection of such data could assist in ensuring that military personnel reside and recreate in environments that are supportive of the overall military mission.

**Table 5.1: Randomly Selected Military Installations**

Installation Name	State	City	Military Population	Percent of Military Personnel Included in Sample
<b>Air Force</b>				49%
Davis-Monthan	Arizona	Tucson	6,526	2%
Lackland	Texas	San Antonio	117,994	43%
MacDill	Florida	Tampa	12,000	4%
<b>Navy</b>				30%
Naval Station Norfolk	Virginia	Norfolk	82,896	24%
Naval Air Station Jacksonville	Florida	Jacksonville	10,200	3%
Naval Station Pearl Harbor	Hawaii	Pearl Harbor	13,762	4%
<b>Army</b>				48%
Fort Hood	Texas	Killeen	41,360	15%
Fort Lewis-McChord	Washington	Olympia	39,590	14%
Fort Bragg	North Carolina	Fayetteville	52,280	19%
<b>Marine Corps</b>				60%
Camp Lejeune	North Carolina	Jacksonville	45,622	30%
Camp Pendleton	California	Oceanside	33,700	22%
Marine Corps Base Hawaii	Hawaii	Kaneohe Bay	11,702	8%

Table 5.2: Risk-Index Codebook

Variable	Points Attributed
<b>Promotion</b>	
What percentage of the front window is covered by alcohol signs/advertisements, including neon lights? (California Friday Night Live Partnership, 2013; Kuo et al., 2003; Kwate & Meyer, 2009)	<i>On Sale:</i> 0 Points: 0% 1 Point: <36% 2 Points: 37% + <i>Off Sale:</i> 0 Points: 0 1 Point: <47% 2 Points: 48+
How many alcohol advertisements are there inside the sale? (Anderson et al., 2009; Howard et al., 2004; Kuo et al., 2003)	<i>On Sale:</i> 0 Points: 0 1 Point: <23 2 Points: 24+ <i>Off Sale:</i> 0 Points: 0 1 Point: <10 2 Points: 11+
What percentage of indoor advertisements has symbols of military patriotism? (Blake, 1985; McCreanor, Greenaway, Moewaka Barnes, Borell, & Gregory, 2005; D. J. Moore, Williams, & Qualls, 1996)	<i>On Sale:</i> 0 Points: 0 1 Point: <65% 2 Points: 66% + <i>Off Sale:</i> 0 Points: 0 1 Point: <28% 2 Points: 29% +
<b>Price</b>	
How much does a 12 ounce glass of Bud Light cost? (Kuo et al., 2003)	0 Points: \$4.47+ 1 Point: \$2.36-4.46 2 Points: <\$2.35
How much does a shot of Smirnoff Vodka cost? (Kuo et al., 2003)	0 Points: 0 1 Point: \$4.64+ 2 Points: <\$4.63
How much does a 6-pack of Bud Light cost? (Kuo et al., 2003; Wagenaar et al., 2009)	0 Points: \$7.89+ 1 Point: \$6.46-7.88 2 Points: <\$6.45
How much does a 40 ounce bottle of Steel Reserve cost? (Kuo et al., 2003; Wagenaar et al., 2009)	0 Points: \$0.00 1 Point: \$2.40+ 2 Points: <\$2.39
How much does a 750 ml bottle of Smirnoff Vodka cost? (Kuo et al., 2003; Wagenaar et al., 2009)	0 Points: 0 1 Point: \$14.85+ 2 Points: <\$14.84
Is there promotional signage on the outside of the building advertising sale or discounted drink prices? (Chaloupka & Wechsler, 1996)	0 Points: No 2 Points: Yes
Are there all you can drink specials? (Kuo et al., 2003)	0 Points: No 2 Points: Yes
Is there a Happy Hour? (Babor et al., 1978; Baldwin, Stogner, & Miller, 2014)	0 Points: No 2 Points: Yes
Are they offering drink specials available until closing? (Clapp et al., 2007;	0 Points: No

Dodd, Glassman, Arthur, Webb, & Miller, 2010)	2 Points: Yes
Are there any discounts for larger quantities of alcohol? (Baldwin et al., 2014)	0 Points: No 2 Points: Yes
<b>Product</b>	
Does the establishment sell test tube shots or Jell-O shots? (Binakonsky, Giga, Ross, & Siegel, 2011)	0 Points: No 2 Points: Yes
<b>Place</b>	
Are people playing drinking games? (Borsari, 2004; Clapp et al., 2006)	0 Points: No 2 Points: Yes
Is there signage notifying individuals that the sale checks IDs?	0 Points: Yes 2 Points: No



**Table 5.3: Establishment Characteristics**

	<b>Air Force (n=26)</b>	<b>Army (n=28)</b>	<b>Marine Corps (n=28)</b>	<b>Navy (n=30)</b>
<b>License Type</b>				
Bar (n=16)	5 (31%)	6 (38%)	4 (25%)	1 (6%)
Restaurant (n=39)	6 (15%)	9 (23%)	10 (26%)	14 (36%)
Convenience Store (n=33)	8 (24%)	11 (33%)	5 (15%)	9 (27%)
Grocery Store (n=15)	5 (33%)	1 (7%)	7 (47%)	2 (13%)
Liquor Store (9)	2 (22%)	1 (11%)	2 (22%)	4 (44%)
<b>Control State*</b>				
Yes (on-sale)	0	5 (18%)	5 (18%)	5 (17%)
No (on-sale)	11 (42%)	10 (36%)	9 (32%)	10 (33%)
Yes (off-sale)	0	3 (11%)	4 (14%)	5 (17%)
No (off-sale)	15 (58%)	10 (36%)	10 (36%)	10 (33%)
<ul style="list-style-type: none"> <li>• Bar: A counter across which alcoholic drinks or refreshments are served; an establishment that primarily serves alcohol.</li> <li>• Restaurant: a place where people pay to sit and eat meals that are cooked and served on the site.</li> <li>• Convenience Store: a retail store that carries a limited selection of basic items, such as packaged foods and drugstore items, and is open long hours for the convenience of shoppers.</li> <li>• Grocery Store: a store that sells food and household supplies.</li> <li>• Liquor Store: a <b>store</b> that sells alcoholic beverages for consumption elsewhere.</li> <li>• Control State: a state that controls the sale of distilled spirits and, in some cases, wine through government agencies at the wholesale level. Control states may also control retail sales for off-sale consumption (National Alcohol Beverage Control Association, 2016).</li> </ul>				

**Table 5.4: Summary Risk Scores**

	Low	Medium	High
<b>Off-Sale</b>			
Convenience Store (n=33)	10 (30%)	21 (64%)	2 (6%)
Grocery Store (n=15)	5 (33%)	10 (67%)	0 (0%)
Liquor Store (9)	1 (11%)	5 (56%)	3 (33%)
<b>On-Sale</b>			
Restaurant (n=39)	4 (10%)	17 (44%)	18 (46%)
Bar (n=16)	3 (19%)	6 (38%)	7 (44%)

**Table 5.5: Establishment Risk Scores by Military Service**

	Low	Medium	High
<b>Air Force</b>			
Convenience Store (n=8)	0 (0%)	7 (88%)	1 (13%)
Grocery Store (n=5)	1 (20%)	4 (80%)	0 (0%)
Liquor Store (2)	0 (0%)	1 (50%)	1 (50%)
Restaurant (n=6)	0 (0%)	3 (50%)	3 (50%)
Bar (n=5)	0 (0%)	3 (60%)	2 (40%)
<b>Army</b>			
Convenience Store (n=11)	5 (45%)	6 (55%)	0 (0%)
Grocery Store (n=1)	0	1 (100%)	0 (0%)
Liquor Store (1)	1 (100%)	0 (0%)	0 (0%)
Restaurant (n=9)	0 (0%)	4 (44%)	5 (56%)
Bar (n=6)	1 (17%)	1 (17%)	4 (67%)
<b>Marine Corps</b>			
Convenience Store (n=5)	1 (20%)	4 (80%)	0 (0%)
Grocery Store (n=7)	3 (43%)	4 (57%)	0 (0%)
Liquor Store (2)	0 (0%)	2 (100%)	0 (0%)
Restaurant (n=10)	3 (30%)	4 (40%)	3 (30%)
Bar (n=4)	1 (25%)	2 (50%)	1 (25%)
<b>Navy</b>			
Convenience Store (n=9)	4 (44%)	4 (44%)	1 (11%)
Grocery Store (n=2)	1 (50%)	1 (50%)	0 (0%)
Liquor Store (4)	0 (0%)	2 (50%)	2 (50%)
Restaurant (n=14)	1 (7%)	6 (43%)	7 (50%)
Bar (n=1)	1 (100%)	0 (0%)	0 (0%)

## Chapter 6 : Integrative Summary

### Key Findings

Alcohol consumption is an important contributing factor to a number of physical, mental, social, and criminal justice issues that plague the military and communities as a whole (Barlas et al., 2013; Holder & Edwards, 1995; Rehm et al., 2009; Stahre et al., 2009). Adapting Erving Goffman's concept of total institutions (Goffman, 1961), this dissertation has established that colleges and the military are institutions with similar drinking behaviors, consequences, and cultures; as a result, the military may be able to benefit from interventions that have been used to effectively reduce high-risk alcohol consumption and related harms among college students. As discussed in Aim 1 (Chapter 3), the military may be a stronger institution than colleges due to the strict hierarchical command structure that begins at the Department of Defense and is filtered through to the installation level. This greater control exhibited by the military creates the potential for comprehensive, consistently enforced alcohol prevention interventions that may have widespread and sustainable effects on military personnel and their families.

Aim 2 (Chapter 4) analyzes the alcohol outlet density around 23 military installations and is the first study to analyze the alcohol outlet density around large military installations in the United States. This chapter identified a clustering of off-sale alcohol outlets within close proximity of half of sampled installations. Comparing this clustering to college campuses, where a more substantial literature exists on both outlet density and its negative effects, the off-sale alcohol outlet density per 1,000 military personnel within three miles of installations was higher than the previously reported off-sale alcohol outlet density per 1,000 undergraduate students within three miles of college campuses (Scribner et al., 2008). However, on-sale alcohol outlet density was higher near college campuses than military installations. As with college campuses, the sheer number of alcohol outlets around military installations creates a high-risk environment where alcohol is readily available; abundant research has shown that the easier alcohol is to access, the greater the consumption patterns and related-consequences will be (Gruenewald, 2011; R. S. Moore et al., 2007).

In addition to alcohol outlet density, there are a number of other outlet-related risk factors that may contribute to excessive alcohol consumption by military personnel. Aim 3 (Chapter 5) explored some of the high-risk contributing factors in a number of alcohol outlets surrounding military installations using the taxonomy of the 4P's of marketing (price, promotion, place, and product) to describe the different categories of marketing. Literature has consistently shown that, taken individually, these factors directly correlate with excessive alcohol consumption and related harms (Anderson et al., 2009; Chaloupka et al., 2002; Howard et al., 2004; O'Brien, McCoy, Rhodes, Wagoner, & Wolfson, 2008; Wagenaar et al., 2009); the study presented in Chapter 5 looked at the entire alcohol outlet establishment and the risk created when these risk factors work together to promote and sell alcohol to the vulnerable military population. This paper is the first to look at how multiple "P's" synergistically interact to create higher risk than a single element alone.

Taken together, these chapters provide a comprehensive view of the alcohol environment surrounding military installations, and suggest points of intervention to reduce high-risk alcohol consumption and related harms among military personnel and their families. There are a number of practical applications to address alcohol problems that can be undertaken by the military, local community, or state legislators. These are described in greater detail below.

## **Implications for Public Health Practice**

### **Community-Based Comprehensive Strategies**

As Chapter 3 established, there are substantial similarities between military installations and college campuses. There is also an extensive literature on evidence-based interventions that have been implemented on and around college campuses, but there is no such literature regarding military installations. Recent work on environmental strategies to address high risk drinking and consequences by college students provides a possible model that could be adapted to the military installation-community context (Clapp et al., 2005; T. F. Nelson et al., 2005; Saltz et al., 2010; Wolfson et al., 2012). For example, the Study to Prevent Alcohol Related Consequences (SPARC) was a campus-community trial that tested a comprehensive intervention using a community

organizing approach to implement environmental strategies in and around college campuses.

Implemented strategies included restricting the provision of alcohol to underage or intoxicated students; improving coordination between campus and community police; restricting alcohol use at campus events; limiting the amount, type, and placement of pro-drinking messages seen on campus; and increasing responsible beverage service policies and practices. Using four waves of data from the study's annual College Drinking Survey (CDS), the study showed decreases in severe alcohol-related consequences in the intervention group compared to the control group due to students' own drinking and alcohol-related injuries caused to others (Wolfson et al., 2012). These results indicate that a community-level approach focused on planning and implementation of environmental strategies in and around the college campus can produce significant changes in levels of high risk drinking and alcohol-related consequences among college students. The implementation of environmental strategies through community groups is most effective when supported by training, technical assistance, and modest funding from an outside organization (Martin et al., 2012). Similar environmental strategies can be implemented both on and off military installations, and should be implemented through a joint military-community collaboration. This collaborative would include active military involvement on local coalitions or civilian involvement in military programs and boards, and joint decision making on how to best reduce high-risk alcohol consumption both on and off the military installation.

### **Interventions to Reduce High Risk Alcohol Consumption**

Potential approaches to reducing alcohol consumption and related harms among military personnel have shown varied efficacy in other settings (Moreira et al., 2009), but have not yet been fully tested in the military. Interventions should be multi-level and multi-component, including one or more individual strategies in addition to one or more environmental strategies (Mosher & Jernigan, 1989; Wagenaar & Perry, 1994). Examples of both individual and environmental strategies are provided below, and implementation of these evidence-based approaches could be a valuable first

step in protecting the lives of soldiers, sailors, pilots and Marines, and ultimately protecting the security of the country as a whole.

### ***Individual-Level Interventions***

SBIRT (Screening, Brief Intervention, Referral to Treatment) has been shown to be one of the most effective individual-level prevention strategies available to reduce excessive alcohol consumption, including in the military population (Ahmadi & Green, 2011; Fernandez et al., 2006; Guide to Community Preventive Services, 2012). SBIRT can help identify extreme cases of alcohol use that are prevalent among those with combat experience or PTSD by focusing on people who may be at risk of alcohol dependence or who engage in hazardous drinking (Brown et al., 2012). As it has already been implemented on a number of installations, this strategy is a feasible option for military installations to consider expanding. By providing supplemental funding from the DoD to improve and expand SBIRT services, this program may show greater reductions in alcohol use. The amount of funding needed will vary by base, depending on the existing level of commitment from both the DoD and the local installation.

### ***Environmental Interventions***

Individual-level strategies such as SBIRT may have a greater chance of being successful if the environments in which they are implemented do not condone or encourage high-risk drinking. Environmental interventions like those presented here should be implemented in communities to complement the effectiveness of individual-level strategies and create a safer environment on and around military installations.

Environmental interventions could be implemented at the local, state, or federal level. Federal and state governments may hold primary authority to implement certain alcohol control policies, but states vary in the extent that they grant control to localities to implement policies to reduce alcohol consumption and related harms. It is important to note that it can be difficult to pass policies at the state level, and those that are passed are potentially less impactful than policies passed at the local level for a number of reasons, including alcohol industry lobbying that may dilute the strength of state-level policies (American Medical Association, 2002). In general, the science of local

alcohol control policies has advanced significantly in the past two decades (Holder & Reynolds, 1997; Wittman, 2007). In states that allow local control, the benefits of local policies lie in the ability of communities to craft policy language responding to their unique alcohol-related problems. For example, a state policy to reduce alcohol outlet density cannot reflect the different outlet clustering patterns around military installations, college campuses, or downtown nightlife areas that may exist in different communities. Due to the importance of local conditions and potential barriers of passing policy at the state and federal level, the strategies presented here are focused on the city or county level as the primary point of intervention. It should be noted that local coalitions can also work to implement policies at the state level if their state's legal environment preempts them from taking action at the local level.

### **Reducing Alcohol Outlet Density**

As discussed in Chapter 4, regulating alcohol outlet density is an evidence-based strategy that has been successfully implemented in numerous locations across the country. There are a number of options for reducing density in a community, including Conditional Use Permits (CUP) and Deemed Approved Ordinances (DAO) (Jernigan et al., 2013). A CUP subjects certain land uses to special conditions to ensure compatibility with other, nearby land uses, while DAOs primarily target businesses that have been grandfathered into existing license restrictions. CUPs allow communities to have more control over the alcohol outlet land use permitting process. As part of the CUP application process, city or county councils or their designees determine if a request for an alcohol sales permit will have a negative impact on their community. These permits, among other things, can require operational conditions such as spacing between alcohol outlets, mandatory responsible beverage service training for those serving alcohol, and restrictions on the alcohol products sold. For example, the city of Ventura, CA banned the sale of beer or malt beverages in containers greater than 32 ounces (with the exception of kegs), mandated server training programs for all individuals who will sell or serve alcohol or manage those who sell or serve alcohol, and will not approve a permit for an outlet that will “contribute to an undue concentration of alcohol establishments in the



area”(pg. 3) (City of San Buenaventura, ND). The City of El Cajon, CA places explicit distance requirements on off-sale alcohol outlets and does not allow new establishments within 600 feet of a residentially zoned property, public or private school, health care facility, religious facility, park, or playground. El Cajon also specified that wine cannot be sold in containers of less than 750 milliliters, distilled spirits cannot be sold in containers of less than 375 milliliters, airline bottles and flasks are not allowed for sale, and alcoholic beverages cannot be displayed within five feet of the store entrance (City of El Cajon, 2013). These approaches could be applied directly to the alcohol outlets that surround military installations, for example, by requiring applicant establishments to be a set number of feet away from entrances to a military installation, and limiting high-risk alcohol products from being sold in nearby alcohol outlets.

#### **Increasing the Price of Alcohol**

Increasing the price of alcohol through minimum unit pricing policies, increasing taxes, or banning price discounting has also been shown to be effective in reducing high-risk alcohol consumption (Babor et al., 1978; Chaloupka et al., 2002; Elder et al., 2010; Kuo et al., 2003). These strategies are particularly relevant for the military population, as many bars near military installations advertise specials or deals that provide more alcohol for less money (Ames & Cunradi, 2004) and directly target military personnel (R. S. Moore et al., 2007).

#### **Changing Sales and Service Practices**

Reducing high risk drinking by requiring those who serve and sell alcohol to undergo responsible beverage service training has been shown to be effective in both military (Saltz, 1987) and civilian settings in reducing alcohol consumption and related problems (Mosher, Toomey, Good, Harwood, & Wagenaar, 2002; Saltz, 1997; Toomey et al., 2001). Enforcing existing laws and practices is also critical: the Community Preventive Services Task Force has recommended enhanced enforcement of laws prohibiting the sale of alcohol to minors (Community Preventive Services Task Force, 2006). These initiatives, intended to enhance the enforcement of retailer compliance with minimum legal drinking age laws, have reduced alcohol consumption among underage youth, and decreased sales to underage decoys (Elder et al., 2007).

## **Intervention Implementation**

The implementation of the above environmental strategies is best accomplished through a community-military partnership that works directly with key stakeholders, including base commanders and local policy-makers (Institute of Medicine, 2012; Wagenaar et al., 1999). When an alcohol-related incident occurs off the installation or campus, the institution may only address the behavior of their member rather than the institutional context that permitted or encouraged that behavior. An active coalition could work to implement complementary environmental strategies to address the broader institutional and community risk factors contributing to these incidents.

### ***The Role of the Military in Alcohol Policy***

The military administration may not be able to directly influence the actions of retailers or policy-makers off-base, but it can dictate the behavior of military personnel and ban them from entering particular bars, restaurants, convenience stores, or liquor stores. In many communities with military installations, the military is responsible for much of the economic activity, including in the housing market, the hospitality industry, and other key sectors. This economic influence is often coupled with political clout as the military is a necessary component of a thriving community. Thus, military leaders can take other actions to indirectly influence key community decision-makers to implement any number of the environmental strategies discussed above. Additionally, the success of campus-community coalitions in the college context suggests that military representation on local community coalitions could be an important component of successful implementation and enforcement of policies and environmental strategies (DeJong et al., 1998; Saltz, Welker, Paschall, Feeney, & Fabiano, 2009; Wagoner, Rhodes, Lentz, & Wolfson, 2010).

### ***The Role of Community Coalitions in Alcohol Policy***

There are more than 5,000 community coalitions advocating for and implementing substance use policies and strategies across the country (CADCA, n.d.). Research has shown that coalitions can reduce community-level indicators of substance abuse through policy change (Fagan, David Hawkins, & Catalano, 2011; Fawcett et al., 1997; Linowski & DiFulvio, 2012; Wagoner et al., 2010). Although coalitions can be defined in a number of ways, Fawcett and colleagues' definition is

a widely accepted standard: coalitions are “alliances among representatives of different sectors, organizations, or constituencies for a common purpose such as reducing substance abuse...they attempt to change the programs, policies, and practices of sectors of the community that contribute to the abuse of alcohol, tobacco and other drugs” (Fawcett et al., 1997). Key coalition members include representation from neighborhood groups, parent organizations, law enforcement, public schools, religious entities, treatment/recovery programs, elected officials, sexual assault organizations, college administrators, and alumni (Treno & Holder, 1997). These coalitions organize to mobilize their community and advocate for policy change that addresses one or more of the 4P’s described above.

### **Future Public Health Research**

Research has demonstrated that community-level environmental strategies are highly effective in reducing alcohol-related problems by focusing on the social, political, and economic contexts in which alcohol problems occur (Treno & Lee, 2002). There are a growing number of community coalitions partnering with adjacent military installations, working to change policies and practices to reduce substance abuse and its consequences. For example, two community coalitions in North Carolina worked with Camp Lejeune to conduct an assessment of the substance use problems the community was facing, resulting in a combined initiative that involved increasing DWI checkpoints and conducting an environmental scan of local establishments around the installation (Onslow County Substance Abuse Prevention, n.d.).

This dissertation uses strong theories, including Goffman’s total institutions and the Socio-Ecological Model, and primary data collection to provide a necessary and important theoretical and empirical framework for implementing and evaluating an environmental-level alcohol prevention intervention on and around military installations. A subsequent study should pair the descriptive data presented here with information about alcohol consumption and related harm at the community level in order to determine if there is a correlational relationship between the variables described above and harmful alcohol use. Once this link has been further explored through research, a randomized

community trial should fully explore the applicability of the college campus-community approach to reducing high-risk alcohol consumption by military personnel.

With the aim of reducing excessive alcohol use and related harms, a subsequent study should implement a multi-level, multi-component coalition-driven intervention in the communities surrounding U.S. military installations. By providing training and capacity building to community coalitions, the coalitions will be positioned to collaborate with sectors of the community and installation personnel to implement evidence-based individual and environmental strategies focused on reducing the negative consequences of alcohol use in this population. The proposed intervention should be evaluated using a rigorous group-randomized experimental design.

Data collection should include a survey of alcohol behavior and related harms by military personnel, administrative data from the community, and an environmental scan of the alcohol environment to complement the data collection in this dissertation. The survey should be cross-sectional and repeated multiple times throughout and after the intervention in order to assess changes in consumption and related harms over time among military personnel stationed on installations. Administrative data collection could include local calls for law enforcement service related to disturbances; traffic crash data, including non-fatal and fatal crashes involving alcohol use; emergency room data, including the military's Total Army Injury and Health Outcomes Database (TAIHOD), and local policy data related to alcohol use to track any changes in local or state policies. Finally, an environmental scan of the alcohol establishments around the sampled installations would allow for a direct analysis of the risk environment and consumption behavior. The scan could include observation of selling, purchasing, and consuming behavior for a more comprehensive understanding of establishment practices.

## **Limitations**

In addition to the strengths and limitations listed in each of the chapters above, this dissertation has a number of overall strengths and weaknesses to note.

Conducting primary data collection has its own limitations, many of which are described in Chapter Five. Data collection was conducted over a seven-month window, and during that time alcohol prices, products, or promotions may have changed. While completing the environmental scans, it became apparent that there were additional variables present in some establishments that might have helped capture and describe the alcohol environments more fully, but these variables were not recorded in order to keep the scanning tool consistent across all establishments. The scans could also have included serving and selling practices in order to better understand the full alcohol risk environment; these data were not included due to the lack of validated measures of serving practices; the inherent subjectivity of capturing these data, such as determining whether a person is intoxicated or underage; and determination that replication of techniques that have been used to assess these practices, such as use of pseudo-patrons, was beyond the scope of this dissertation (Toomey et al., 2016).

Finally, this dissertation relies on the premise that the military and colleges are similar institutions. Although Chapter 3 makes a strong case for the validity of this comparison, the limitations inherent in it also exist throughout this dissertation. This dissertation represents a critical first step towards establishing the premise that interventions that have been successful around college campuses will be successful around military installations. This is a new hypothesis, not yet proven. However, collection and analysis of both ecological and establishment-level data, as has been done here, are critical first steps in testing its validity.

## **Strengths**

This dissertation analyzed the critical problem of alcohol use in the military in a unique way that has not been applied to this institution and its population. The focus on the environment around military installations builds for the first time on work already done in college settings (Scribner et al., 2008; Scribner et al., 2010; Toomey et al., 2007; Wechsler & Nelson, 2008; Wolfson et al., 2012). The three aims work together to provide a more holistic view of the alcohol use and harms prevalent in the military than has generally been the case in the existing literature (see e.g. (Verrall, 2011; Walker et

al., 2012; Wilk et al., 2010; K. M. Wright et al., 2012; Zoricic, Karlovic, Buljan, & Marusic, 2003)).

Analysis of the existing literature on prevalence, harms, and prevention efforts in both military institutions and colleges established the similarities between these two strong institutions. Geospatial analysis documented that alcohol retail environments abound near military installations, in ways that are also similar to college campuses. Finally, the creation and application to these environments of an environmental scanning tool, based in part on tools that have been used for college campus environments, marks the first time that a deeper analysis of the relative risks posed by the practices of individual establishments to military individuals, families and communities has been attempted.

By analyzing the broader role the alcohol environment may play in excessive alcohol consumption, this dissertation contributes to the literature around alcohol use in the military and the role of the alcohol environment in important and meaningful ways. The use of primary data collection provided the author the opportunity to become immersed in the existing literature around alcohol use, related harms, and prevention efforts in the U.S. military, as well as affording the first-hand experience and understanding of what communities outside of military installations look like. This entrenchment in the data provided a deeper and richer understanding of the military community than would have been possible from secondary analysis of existing data alone. Perhaps most importantly, and building on similarities with college campuses, assessment of outlet densities, and estimates of risks posed by the practices of individual establishments, this dissertation provides concrete recommendations for ways to address the high-risk drinking and high-risk environments surrounding military installations; evidence-based interventions are provided in each chapter as ways to move forward and improve the health and safety of military communities.

## **Conclusion**

This dissertation argues that addressing the military's alcohol could benefit from experience with the prevention of college alcohol problems, and conducting some of the same data collection, analysis, intervention implementation, and evaluation strategies that have been successful on and around college campuses. There are currently more than 1.3 million individuals serving in the U.S.

military (Defense Manpower Data Center, 2015). These men and women are vulnerable to high-risk alcohol consumption resulting from a host of factors, including the stress and consequences of their role as a soldier, PTSD resulting from deployments to a combat zone, as well as the high-risk alcohol environments created on and around many military installations. Although the military has attempted to address underage and excessive alcohol use among its personnel, problems persist and harms continue at the individual, peer, organizational, and societal levels. This dissertation points to a new direction for research and for public health practice, focusing both on community and policy level changes in order to have the greatest impact on risky behavior (Zaza et al., 2000). Given the prevalence of substance use in the military and the dire effects of high-risk drinking on the lives of military personnel, their families, and the country, this dissertation sheds new light on the previously under-studied alcohol environments surrounding military installations. It offers a roadmap for research and practice to prevent excessive consumption, and thereby to ensure the preparedness of our troops, and to protect the health and safety of our military communities.

## Appendix A: DoD Alcohol Prevention Programs

Purpose and Goals	Clinical Focus	Program Evaluation/Outcomes	Target Population	EBPs
<b>Red Ribbon Campaign</b>				
<ul style="list-style-type: none"> <li>The national Red Ribbon campaign raises public awareness and mobilizes communities to combat tobacco, alcohol and drug use among military personnel, civilians and their families.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>N/A*</li> </ul>
<b>That Guy</b>				
<ul style="list-style-type: none"> <li>That Guy is a multimedia campaign designed to reduce binge drinking among military enlisted personnel ages 18–24.</li> <li>The campaign includes online and offline advertising and promotions, viral marketing, a website, <a href="http://www.thatguy.com">www.thatguy.com</a>, public service announcements, and branded collateral materials.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Number of joining social network sites</li> <li>Change in drinking behavior where implemented</li> <li>Overall awareness of campaign</li> <li>Change in drinking attitudes</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Military Pathways</b>				
<ul style="list-style-type: none"> <li>Program offers service personnel and their families the opportunity to take anonymous, mental health and alcohol use self-assessments online, via the phone, and through special events held at installations. Program is designed to help individuals identify their own symptoms and access assistance before a problem becomes serious.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> <li>Screening</li> </ul>	<ul style="list-style-type: none"> <li>Numbers of screenings</li> <li>Quantities of promotional materials distributed</li> <li>Customer satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Reserve</li> <li>National Guard</li> </ul>	<ul style="list-style-type: none"> <li>EBPs are utilized</li> </ul>



				• Dependents
<b>Alcohol and Drug Abuse Prevention and Treatment (ADAPT) Program</b>				
<ul style="list-style-type: none"> <li>The ADAPT Program provides substance related assessment, preventative education, clinical treatment and referral services for Airmen, civilian employees, and family members.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> <li>Diagnosis</li> <li>Treatment</li> </ul>	<ul style="list-style-type: none"> <li>Access time to substance assessment and clinical treatment</li> <li>Proportion of participants completing treatment program (tracked locally only)</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Reserve</li> <li>National Guard</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>Substance Abuse Counselors are trained in motivational interviewing and cognitive-behavioral interventions</li> </ul>
<b>Culture of Responsible Choices (CoRC)</b>				
<ul style="list-style-type: none"> <li>CoRC is a commander's program consisting of a four-tiered approach with emphasis on leadership, individual, base, and community-level involvement—underscoring responsible behaviors including alcohol and drug abuse, the prevention of accidents, tobacco cessation, obesity and fitness, health and wellness, prevention of STDs, etc. CoRC initiatives include Assessment/Screening of risk in all personnel, education/awareness programs, brief interventions and treatment when needed, top down emphasis on responsibility and commitment. Components also include base and local community opportunities for change such as developing a range of alternate activities, media campaign promoting responsibility, coalition</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> <li>Screening</li> <li>Diagnosis</li> <li>Treatment</li> </ul>	<ul style="list-style-type: none"> <li>Alcohol-Related Misconduct (ARM) incidences per 1,000 SMs</li> <li>Drug positives per 1,000 SMs</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>Use EBPs (e.g., screening instruments) recommended by the National Institute of Alcohol Abuse and Alcoholism (NIAAA)</li> </ul>

with community agencies, and monitoring of locally identified metrics.				
<b>Enforcing Underage Drinking Laws (EUDL) Program</b>				
<ul style="list-style-type: none"> <li>EUDL is a pilot prevention program being conducted in conjunction with the Department of Justice (DOJ) and the National Institute of Alcohol Abuse and Alcoholism (NIAAA).</li> <li>EUDL is designed to reduce the availability of alcoholic beverages to and the consumption of alcoholic beverages by underage service members using environmental approaches and community coalitions.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>DWIs/DUIs</li> <li>Traffic accidents</li> <li>Compliance checks</li> <li>Crimes</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>Development of EUDL was predicated on the use of EBPs such as increased enforcement of underage drinking laws, increased DWI/DUI checks, increased compliance checks, covert underage buys, party patrols, etc.</li> </ul>
<b>Prevention, Education, and Training Program</b>				
<ul style="list-style-type: none"> <li>The program provides soldiers with substance abuse prevention and awareness training to include at a minimum: Army Substance Abuse Program (ASAP) policies and services, consequences of alcohol and other drug abuse, incompatibility of alcohol and other drug abuse with physical and mental fitness, combat readiness, Army Values, and the Warrior Ethos.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Screening Enrollment Report by Installation and Command</li> <li>Education/Training Report by Unit</li> <li>UPL Certification Database by Individual Command</li> <li>Resource and Performance Report</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Reserve</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>ADAPT curriculum utilizes EBPs</li> </ul>

		by Installation and Command		
<b>Substance Abuse Rehabilitation Program (SARP)</b>				
<ul style="list-style-type: none"> <li>Using the American Society of Addiction Medicine patient placement criteria, SARP matches the appropriate intensity of treatment to the individual's level of need. SARP covers a spectrum referred to as the continuum of care that ranges from early intervention, through outpatient, intensive outpatient, residential and medically managed care.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> <li>Screening</li> <li>Diagnosis</li> <li>Treatment</li> </ul>	<ul style="list-style-type: none"> <li>Number of patients retained on Active Duty after 1 year</li> <li>Percentage of patients completing treatment</li> <li>Length of time to wait for a screening</li> <li>Length of time before treatment begins</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Reserve</li> <li>Dependents</li> </ul>	<ul style="list-style-type: none"> <li>Motivational interviewing</li> <li>Twelve-step facilitation</li> <li>Living in Balance</li> <li>Contingency management</li> <li>Cognitive behavioral intervention</li> </ul>
<b>Right Spirit Campaign</b>				
<ul style="list-style-type: none"> <li>The Right Spirit Campaign enhances fleet readiness by the reduction of alcohol abuse and related incidents, and provides a safe and productive working environment while deglamorizing alcohol use. The campaign uses videos, posters, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Prevention</li> </ul>	<ul style="list-style-type: none"> <li>Number of command and self-referrals for alcohol screenings</li> <li>Number of participants in local events held to deglamorize</li> </ul>	<ul style="list-style-type: none"> <li>Active Duty</li> <li>Reserve</li> </ul>	<ul style="list-style-type: none"> <li>CSAP prevention strategies</li> </ul>

		alcohol use <ul style="list-style-type: none"> <li>• Reduction in number of alcohol incidents fleet-wide</li> </ul>		
<b>Alcohol Abuse Prevention Program</b>				
<ul style="list-style-type: none"> <li>• A comprehensive alcohol abuse prevention and control program for all Navy military personnel that focuses on the responsible use of alcoholic beverages through education, training, and awareness. Assigns responsibility to all personnel and recognizes that alcohol abuse and dependency are preventable and treatable.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Number of personnel with ARIs</li> <li>• Number of personnel with DWI</li> <li>• Number of treatment failures</li> <li>• Number of self-referrals</li> </ul>	<ul style="list-style-type: none"> <li>• Active Duty</li> <li>• Reserve</li> </ul>	<ul style="list-style-type: none"> <li>• Community-based processes, environmental strategies, information dissemination, alternative activities, education, and problem recognition and referral</li> </ul>
<b>Marine Corps Substance Abuse Program</b>				
<ul style="list-style-type: none"> <li>• The Marine Corps Substance Abuse Program provides screening and assessment, and Treatment services for Active Duty military members and other eligible beneficiaries with substance abuse disorders.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention</li> <li>• Screening</li> <li>• Diagnosis</li> <li>• Treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Number of completion of treatments</li> <li>• Number of treatment failures</li> <li>• Number of re-screens after completion of</li> </ul>	<ul style="list-style-type: none"> <li>• Active Duty</li> </ul>	<ul style="list-style-type: none"> <li>• ASAM Patient Placement Criteria for the treatment of substance related disorders MX-Used for alcohol treatment</li> </ul>

		treatment		
<b>Substance Abuse Prevention and Intervention Program</b>				
<ul style="list-style-type: none"> <li>• The Marine Corps Substance Abuse Prevention program provides prevention tools such as antidrug videos and games, substance abuse prevention tool kits, Command Summits, and the Battalion Alcohol Skill Intervention Curriculum that help commanders prevent problems that detract from unit performance and mission readiness.</li> <li>• To assist in the commander's prevention efforts, a Drug Demand Reduction Coordinator, Substance Abuse Control Officers, and Alcohol Abuse Prevention Specialists are available to provide support in the following areas: <ul style="list-style-type: none"> <li>○ Illegal drug use prevention activities</li> <li>○ Drug testing</li> <li>○ Implementing prevention programs</li> <li>○ Coordinating treatment services with the SACC</li> <li>○ Conducting aftercare</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Number of positive samples</li> <li>• Number of multiple positives</li> <li>• Number of prescription drug confirmed positives</li> </ul>	<ul style="list-style-type: none"> <li>• Active Duty</li> <li>• Reserve</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention tools created specifically for the Marine Corps based on research by the Naval Health Research Center</li> </ul>
These descriptions were compiled and published by the Institute of Medicine (Institute of Medicine, 2013)				

## Appendix B: Examples from the “That Guy” Campaign

### A. “That Guy Buzzed” mobile game




### B. Definition of “That Guy” complete with rotating images of intoxicated young people

Who is **THAT GUY**?

That Guy ˈ([th]at'gɪ), n.

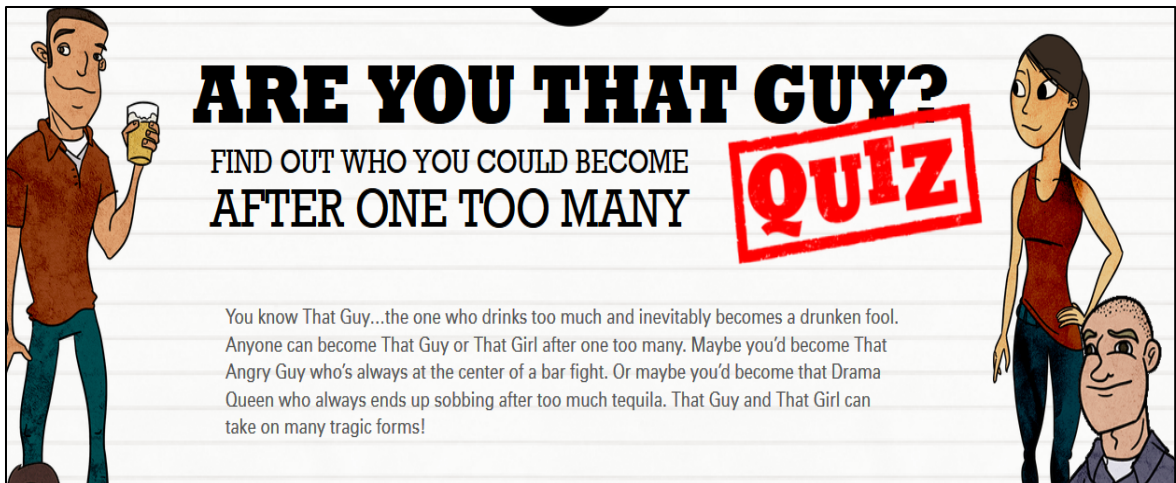
1. Anyone (yes, ladies, you too!) who, after drinking excessive amounts of alcohol, loses control of self or situation with humiliating or compromising results:
  - a. Used to suggest shameful or embarrassing behavior: What is That Guy thinking? Or, no way am I hanging out with That Guy.
  - b. Used to imply unpleasant transformation or metamorphosis: Everything was great until my friend drank a few too many and turned into That Guy.



C. "That Guy" Memes



D. An online quiz to determine if you are "That Guy"



## Appendix C: On-Sale Environmental Scanning Tool

1. Time
2. Name of establishment
3. License type  
(grocery store, bar, restaurant, liquor store, etc.)
4. City/State
5. Located in a control state? *Mark only one oval.*  
Yes  
No
6. What are the posted hours of sale?
7. Are there signs saying "only 21 allowed"? *Mark only one oval.*  
Yes  
No  
Other:
8. Is there signage notifying individuals that the premise checks IDs? *Mark only one oval.*  
Yes  
No  
Other:
9. Are there "no loitering" signs posted? *Mark only one oval.*  
Yes  
No  
Other:
10. Is the outside of the building well-lit? *Mark only one oval.*  
Yes  
No  
Other:
11. Does any drinking occur outside of the licensed premises?  
*Mark only one oval.*  
Yes  
No
12. Are people loitering outside the premises?  
*Mark only one oval.*  
Yes  
No
13. Is there promotional signage on the outside of the building advertising sale or discounted drink prices?  
*Mark only one oval.*  
Yes  
No



14. If yes, how many?
- 15.
16. Are there store made signs or advertisements? *Mark only one oval.*  
     Y e s  
     N o
17. If yes, how many?
17. Are there professional signs or advertisements? *Mark only one oval.*  
     Y e s  
     N o
18. If yes, how many?
- 19.
20. Are there promotions of large serving sizes or pitchers? *Mark only one oval.*  
     Y e s  
     N o
21. Are there any signs warning of the negative effects of alcohol (i.e. birth defects; mixing alcohol with caffeine, driving while intoxicated, etc.)? *Mark only one oval.*  
     Y e s   N o
22. Are there any alcohol prevention signs? *Mark only one oval.*  
     Y e s  
     Y e s  
     N o
23. What percentage of the front window is covered by alcohol signs/advertisements, including neon lights?  
*Mark only one oval.*  
     >10%  
     20%  
     50%  
     80%  
     Nearly 100%  
     None
24. Are people playing drinking games? *Mark only one oval.*  
     Y e s  
     N o

24. If yes, what kind?

**Promotions**

25. How many alcohol advertisements are there inside the premises?
26. How many alcohol advertisements that depict sexualized images/women?
27. How many alcohol advertisements that depict patriotism or military paraphernalia?
28. How many signs are there about “we ID”, “Must be 21 to purchase Alcohol”, “no sales to minors”?
29. If 1 or more where are they located?
30. Any there age verification signs near the register? *Mark only one oval.*

Y e s

N o

31. Any there age verification devices near the register? *Mark only one oval.*

Y e s

N o

32. Does the establishment give away alcohol-related merchandise or promotional material?

*Mark only one oval.*

Yes

No

33. Are there contests or activities that encourage excessive alcohol use? *Mark only one oval.*

Y e s

N o

34. Are there contests where alcohol is the prize? *Mark only one oval.*

Y e s

N o

35. Does the establishment host special events? *Mark only one oval.*

Y e s

N o

36. Does the establishment sponsor alcohol industry? *Mark only one oval.*

Y e s

N o

***Price***

37. How much does a 12oz glass of Bud Light cost?

38. How much does a shot of Smirnoff Vodka cost?

39. Are there all you can drink specials? *Mark only one oval.*

Y e s

N o

40. Is there a Happy Hour? *Mark only one oval.*

Y e s

N o

41. If yes, what are the hours? (Start)

42. If yes, what are the hours? (End)

43. What is the level of discounting?

44. Is food on sale as well?

45. Are there 2 for 1 specials not associated with happy hour?

46. Are they offering drink specials available until closing?

47. Are there specials on larger quantity drinks (20+ ounces) but not smaller quantity drinks (not associated with happy hour)?

48. Are there any discounts for larger quantities of alcohol?

49. What is a typical beer size? (observation only)
50. What is a typical mixed-drink size? (observation only)
51. Are there specials for certain groups: ladies night, military specific, etc.? If yes, what groups?
52. Are there sales on larger serving size/pitchers?
53. Does the establishment give away alcohol for free?

**Product**

54. Does the establishment sell: *Check all that apply.*
  - Alcopops?
  - Test tube shots?
  - Jell-O shots?
  - Premixed pouches?
  - Alcohol infused whipped cream?
  - Tobacco?
  - Beer in single can with high alcohol content?
  - Single unit sales?
  - Is malt liquor sold?
  - Is grain alcohol sold?
  - Are airline bottles sold?
  - Are any alcohol products military branded?
  - Is there a beer cave inside the off-premise location?
55. On the shelf  
*Check all that apply.*
  - Draft
  - Lager
  - Ales
  - Alcopops/specialty
  - Liquor/spirits
  - Wine
  - Nonalcoholic Energy Drinks
56. Are they selling cold singles for consumption?
57. How close is alcohol to other products (i.e. soda, juice, etc.)
56. In a display area at the front of the store *Check all that apply.*
  - Draft
  - Lager
  - Ales
  - Alcopops/specialty
  - Liquor/spirits
  - Wine
  - Nonalcoholic Energy Drinks
  - Are they selling cold singles for consumption?
  - How close is alcohol to other products (i.e. soda, juice, etc.)
57. In a refrigerated area *Check all that apply.*

Draft  
Lager  
Ales  
Alcopops/specialty  
Liquor/spirits  
Wine  
Nonalcoholic Energy Drinks  
Are they selling cold singles for consumption?  
How close is alcohol to other products (i.e. soda, juice, etc.)

58. Behind the bar or counter *Check all that apply.*

Draft  
Lager  
Ales  
Alcopops/specialty  
Liquor/spirits  
Wine  
Nonalcoholic Energy Drinks  
Are they selling cold singles for consumption?  
How close is alcohol to other products (i.e. soda, juice, etc.)

59. By order only *Check all that apply.*

Draft  
Lager  
Ales  
Alcopops/specialty  
Liquor/spirits  
Wine  
Nonalcoholic Energy Drinks  
Are they selling cold singles for consumption?  
How close is alcohol to other products (i.e. soda, juice, etc.)

## Appendix D: Off-Sale Environmental Scanning Tool

1. Time
2. Name of Establishment
3. License type  
(grocery store, bar, restaurant, liquor store, etc.)
4. City/State
5. Located in a control state? *Mark only one oval.*  
  - Yes
  - No
6. Dedicated alcohol establishment? *Mark only one oval.*  
  - Yes
  - No
7. Separate entrance for alcohol license *Mark only one oval.*  
  - Yes
  - No
8. What are the posted hours of sale?
9. Are there signs saying "only 21 allowed"? *Mark only one oval.*  
  - Yes
  - No
  - Other:
9. Is there signage notifying individuals that the premise checks IDs? *Mark only one oval.*  
  - Yes
  - No
  - Other:
10. Are there "no loitering" signs posted? *Mark only one oval.*  
  - Yes
  - No
  - Other:
11. Is the outside of the building well-lit? *Mark only one oval.*  
  - Yes
  - No
  - Other:
12. Does any drinking occur outside of the licensed premises? *Mark only one oval.*  
  - Yes
  - No
13. Are people loitering outside the premises? *Mark only one oval.*  
  - Yes
  - No

14. Is there promotional signage on the outside of the building advertising sale or discounted drink prices?  
*Mark only one oval.*  
Yes  
No
16. If yes, how many?
17. Are there store made signs or advertisements? *Mark only one oval.*  
Yes  
No
18. If yes, how many?
19. Are there professional signs or advertisements? *Mark only one oval.*  
Yes No
20. If yes, how many?
21. Are there promotions of large serving sizes or pitchers? *Mark only one oval.*  
Yes No
22. Are there any signs warning of the negative effects of alcohol (i.e. birth defects; mixing alcohol with caffeine, driving under the influence)?  
*Mark only one oval.*  
Yes  
No
23. Are there any alcohol prevention signs? *Mark only one oval.*  
Yes  
No
24. What percentage of the front window is covered by alcohol signs/advertisements, including neon lights?  
*Mark only one oval.*  
>10%  
20%  
50%  
80%  
Nearly 100%  
None
25. How many alcohol advertisements are there inside the premises?
26. How many alcohol advertisements that depict sexualized images/women?
27. How many alcohol advertisements that depict patriotism or military paraphernalia?
28. How many signs are there about “we ID”, “Must be 21 to purchase Alcohol”, “no sales to minors”?
29. If 1 or more where are they located?
30. Are there age verification devices near the register? *Mark only one oval.*  
Yes

No

31. Does the establishment give away alcohol-related merchandise or promotional material?

*Mark only one oval.*

Yes

No

32. Are there contests or activities that encourage excessive alcohol use?

*Mark only one oval.*

Yes

No

33. Are there contests where alcohol is the prize?

*Mark only one oval.*

Yes

No

34. Does the establishment host special events?

*Mark only one oval.*

Yes

No

35. Does the establishment sponsor alcohol industry events?

*Mark only one oval.*

Yes

No

36. How much does a six-pack of Bud Light cost?

37. How much does a 40 ounce of Steel Reserve cost?

38. How much does a bottle of Wild Irish Rose cost?

39. How much does a 750 ml of Smirnoff Vodka cost?

40. Is any beer on sale? *Mark only one oval.*

Yes

No

NA

41. If yes, what quantity? *Check all that apply.*

single unit

6

12

18

24

30

42. Is any wine on sale? *Mark only one oval.*

Yes

No

NA

43. If yes, what quantity
44. Is any liquor on sale? *Mark only one oval.*  
     Yes  
     No  
     NA
45. If yes what quantity
46. Are there any instances where larger quantities (18 or 24 packs of beer) were on sale but not smaller quantities (6 or 12 pack) of the same product?  
*Mark only one oval.*  
     Yes  
     No  
     NA
47. What is the cheapest form of alcohol I can buy? (list type, brand, and cost)
48. Does the premises sell: *Check all that apply.*  
     Alcopops?  
     Test tube shots?  
     Jell-O shots?  
     Premixed pouches?  
     Alcohol infused whipped cream?  
     Tobacco?  
     Beer in single can with high alcohol content?  
     Single unit sales?  
     Is malt liquor sold?  
     Is grain alcohol sold?  
     Are airline bottles sold?  
     Are any alcohol products military branded?  
     Is there a beer cave inside the off-premise location?

**Product Location**

49. On the shelf  
*Check all that apply.*  
     Draft  
     Lager  
     Ales  
     Alcopops/specialty  
     Liquor/spirits  
     Wine  
     Nonalcoholic Energy Drinks  
     Are they selling cold singles for consumption?  
     How close is alcohol to other products (i.e. soda, juice, etc.)
50. In a display area at the front of the store *Check all that apply.*



Draft  
 Lager  
 Ales  
 Alcopops/specialty  
 Liquor/spirits  
 Wine  
 Nonalcoholic Energy Drinks  
 Are they selling cold singles for consumption?  
 How close is alcohol to other products (i.e. soda, juice, etc.)

51. In a refrigerated area *Check all that apply.*

Draft  
 Lager  
 Ales  
 Alcopops/specialty  
 Liquor/spirits  
 Wine  
 Nonalcoholic Energy Drinks  
 Are they selling cold singles for consumption?  
 How close is alcohol to other products (i.e. soda, juice, etc.)

52. Behind the bar or counter *Check all that apply.*

Draft  
 Lager  
 Ales  
 Alcopops/specialty  
 Liquor/spirits  
 Wine  
 Nonalcoholic Energy Drinks  
 Are they selling cold singles for consumption?  
 How close is alcohol to other products (i.e. soda, juice, etc.)

53. By order only *Check all that apply.*

Draft  
 Lager  
 Ales  
 Alcopops/specialty  
 Liquor/spirits  
 Wine  
 Nonalcoholic Energy Drinks  
 Are they selling cold singles for consumption?  
 How close is alcohol to other products (i.e. soda, juice, etc.)

## Appendix E: Total Possible Outlets in Aim 3 Sampling Frame

**Table E.1: Number of Establishments within 2 Miles of Aim 3 Installations**

Installation Name	State	City	Total	On-Sale	Off-Sale
Air Force					
Davis-Monthan	Arizona	Tucson	138	67	71
Lackland	Texas	San Antonio	100	58	42
MacDill	Florida	Tampa	54	21	33
Navy					
Naval Station Norfolk	Virginia	Norfolk	79	29	50
Naval Air Station Jacksonville	Florida	Jacksonville	94	42	52
Naval Station Pearl Harbor	Hawaii	Pearl Harbor	137	64	73
Army					
Fort Hood	Texas	Killeen	124	45	69
Fort Lewis-McChord	Washington	Olympia	204	105	99
Fort Bragg	North Carolina	Fayetteville	24	15	9
Marine Corps					
Camp Lejeune	North Carolina	Jacksonville	27	10	17
Camp Pendleton	California	Oceanside	211	142	69
Marine Corps Base Hawaii*	Hawaii	Kaneohe Bay	38	20	18
*Included establishments within five miles of the installation					

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## Alicia Sparks - Curriculum Vitae

### Personal

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BORN: February 26, 1987, Petaluma, CA

### Education

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2012-PRESENT JOHNS HOPKINS UNIVERSITY- Baltimore, MD

Doctor of Philosophy

Health, Behavior, & Society

*Independent Research:* Qualitative data analysis of interviews conducted with Iraq and Afghanistan veterans about health promotion messages in the military.

*Independent Research:* State policy review of substance abuse treatment in mandated domestic batterer programs/treatment.

2010-2012 UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL – Chapel Hill, NC

Master of Public Health

Health Behavior

*Independent research:* Qualitative study of Operation Iraqi Freedom and Operation Enduring Freedom veteran's experience with health promotion messages during their time in the military and as a veteran. Was responsible for study design, all IRB's (including UNC-CH and the Durham VA), study recruitment, data collection, and data analysis.

2005-2009 UNIVERSITY OF CALIFORNIA, SANTA BARBARA – Santa Barbara, CA

B.A. in Political Science

Deans Honors 2006, 2007, 2008, 2009

B.A. in Sociology

Alpha Kappa Delta- International Sociology

Honors Society

UNIVERSITY OF CALIFORNIA, EDUCATION ABROAD PROGRAM – Accra, Ghana

Univeristy of Ghana, Legon, Ghana

*Independent research:* Comparison of the efficacy of HIV prevention policies between the government and non-government organizations. Involved in-depth individual interviews with high ranking health officials and people affected with HIV/AIDS.

### Professional Experience

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ABT ASSOCIATES, INC.

*Analyst, 6/2014-Present*

- Manage the development of the first ever Surgeon General's Report on Substance Use and Health
- Assist in manuscript development for DoD-funded research
- Assist in proposal development for a myriad of health issues
- Conduct qualitative research on HIV, substance use, and mental health
- Conduct literature reviews
- Support evaluations of nationally recognized programs

NATIONAL LIQUOR LAW ENFORCEMENT ASSOCIATION – Calverton, MD

*Research Associate, 6/2013-2/2015*

- Manage numerous national data collection efforts and analysis
- Assist in the development of source investigation protocols and data collection forms for a NHTSA project



CENTER FOR ALCOHOL MARKETING & YOUTH- Baltimore, MD

*Fellow, 8/2012-5/2014*

- Assisted in manuscript writing/preparation focused on addressing alcohol use among underage youth
- Assisted in the writing and submission of multiple federal grants
- Analyzed data on alcohol marketing and advertising for presentation and publication

WAKE FOREST UNIVERSITY, DPT OF SOCIAL HEALTH SCIENCES - Winston Salem, NC

*Research Assistant, 6/ 2011-12/2013*

- Managed the grant writing and submission process with multiple subcontractors, helping to acquire three federal grants
- Assisted in manuscript writing/preparation focused on structural changes to improve public health
- Assisted in the creation of evaluation plans for large scale interventions
- Assisted with IRB applications

CLINICAL TOOLS, INC – Chapel Hill, NC

*Research Assistant, 9/2010-5/2011*

- Edited online medical education provider courses
- Assisted with grant writing and grant reporting focused on educating providers on substance use
- Analyzed process and outcome evaluation qualitative and quantitative data for reporting

AMERICORPS\*VISTA, RICHLAND COUNTY HEALTH DEPARTMENT – Sidney, MT

*Multi-Learning Collaborative VISTA, 7/2009-7/2010*

- Assisted 17 county health departments in preparing for accreditation
- Wrote and secured grants focused on quality improvement and health department accreditation
- Collected and analyzed data for reports to the Robert Wood Johnson Foundation and to the Montana state health department
- Planned regional conferences for more than 12 health departments focused on preparing for the Public Health Accreditation Board's national standards

RICHLAND COUNTY AMBULANCE SERVICE – Sidney, MT

*First Responder, 11/2009-7/2010*

- Nationally licensed as a First Responder
- Drove ambulances, assessed injured and ill patients, assisted EMT's on scene and doctor's in the emergency room
- Took county wide emergency calls as part of twelve or twenty four hour shifts

PACIFIC PRIDE FOUNDATION – Santa Barbara, CA

*Necessities of Life volunteer, Syringe Exchange program Intern 9/2009- 5/2010*

- Ran the syringe exchange clinic once a week
- Provided education on harm reduction techniques
- Educated HIV positive patients about healthy food options and nutrition

SONOMA COUNTY HEALTH DPT, HIV PREVENTION AND PLANNING – Santa Rosa, CA

*Intern, 6/2008-9/2008*

- Assisted on deliverables for federal grants including
- Wrote part of the county's prevention plan
- Created visual displays for the public with information on HIV prevention information

## Teaching Experience

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LEAD TEACHING ASSISTANT: INTRODUCTION TO CAMPAIGNING AND COMMUNITY ORGANIZING – Johns Hopkins Bloomberg School of Public Health

- Third Term, 2016
- Summer Term, 2015
- Third Term, 2015
- Summer Term, 2014
- Third Term, 2014
- Summer Term, 2013
- Responsible for all student communication and grading.
- Participated in course creation and helped establish lecture material, readings, and developed assignments.

TEACHING ASSISTANT: ALCOHOL, SOCIETY, AND HEALTH – Johns Hopkins Bloomberg School of Public Health

- Third Term, 2015

## Publications

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**Sparks, A.**, Stewart, M., Gierisch, J., Brancu, M., Maman, S., & Straits-Troster, K. (2016). Understanding how OEF/OIF Veterans Conceptualize Health Before, During, and After Military Service. Public Health Reports. Under Review.

**Sparks, A.**, Cohen, J., Rutkow, H., Smith, K., & Jernigan, D. (In Progress). Alcohol Outlet Density around Military Installations in Eight U.S. States.

**Sparks, A.**, Smith, K., Cohen, J. E., Rutkow, H., & Jernigan, D. (In Progress). Interventions to Reduce Alcohol Consumption and Related Consequences: A Comparison of Colleges and Military Bases.

**Sparks, A.**, Rutkow, H., Smith, K., Cohen, J. E., & Jernigan, D. (In Progress). A Description of the Alcohol Environment Surrounding 12 U.S. Military Installations.

Ross, C. S., **Sparks, A.**, & Jernigan, D. H. (2015). Assessing the impact of stricter alcohol advertising standards: the case of Beam Global Spirits. Journal of Public Affairs.

Gilkey, M., Dayton, A., Moss, J., **Sparks, A.**, Grimshaw, A., Bowling, M., & Brewer, N. (2014). Increasing Provision of Adolescent Vaccines in Primary Care: A Randomized Control Trial. Pediatrics. (Awaiting Publication).

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## Presentations

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**Sparks, A.** (2016). Alcohol Outlet Density around Military Installations in Eight U.S. States. Oral Presentation at Alcohol Policy 17 Conference. Washington, D.C.

**Sparks, A.**, Ramirez, R. State Alcohol Law Enforcement Strategies to Improve Public Safety: A National Survey. Talk accepted for oral presentation at Annual Public Health Association Conference. New Orleans, LA.

**Sparks, A.**, Spera, C. A Descriptive Analysis of Alcohol Outlet Density around Air Force Installations in the United States. Poster accepted at Annual American Public Health Association Conference. New Orleans, LA.

**Sparks, A.**, Ross, C., Jernigan, D. (2013). Building a better mousetrap? analysis of one alcohol company's effort at a more restrictive voluntary advertising placement standard. Poster Presentation. Annual Public Health Association Conference. Boston, MA.

Gilkey, M. B., Moss, J. L., **Sparks, A.**, Dayton, A., & Grimshaw, A., Brewer, N. T., (2013). A state health department-led RCT to improve adolescent immunization using the AFIX model. Oral Presentation. Annual Public Health Association Conference. Boston, MA.

Brewer, N. T., Gilkey, M. B., Moss, J. L., **Sparks, A.**, Dayton, A., & Grimshaw, A. (2013). RCT to increase provision of adolescent vaccines in primary care. Poster accepted for presentation at the 2013 Annual Meeting of the Society of Behavioral Medicine. San Francisco, CA.

Gilkey, M. B., Moss, J. L., **Sparks, A.**, Dayton, A., Grimshaw, A., & Brewer, N. T. (2013). Adolescent AFIX: A public health systems approach to improving uptake of adolescent vaccines. Talk accepted

for presentation at the 2013 Annual Meeting of the American Society of Preventive Oncology. Memphis, TN.

**Sparks, A.** (2013). Monitoring Youth Exposure to Alcohol Messaging in US Media. Alcohol Policy 16. Oral Presentation. Washington, D.C.

**Sparks, A.,** Clapp, J. & Bosma, L. (2013). Alcohol and Violence: The Nature of the Relationship and the Promise of Prevention. Authors Meet Critics Session. Alcohol Policy 16, Washington, D.C.

Wagoner, K., **Sparks, A.,** Wolfson, M. (2013). College student perceptions of campus and community alcohol policy enforcement: Does it impact where and how much they drink. Poster presentation. Alcohol Policy 16, Washington, D.C.